

Railroad Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY BY

THE RAILROAD GAZETTE (INC.), 83 FULTON STREET, NEW YORK.

CHICAGO: 160 Harrison St. PITTSBURGH: Farmers' Bank Bldg.

LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, *President and Editor.*

E. A. SIMMONS, *Vice-President.* RAY MORRIS, *Sec'y and Man'g Editor.*

R. S. CHISOLM, *Treasurer.*

The address of the company is the address of the officers.

Subscription, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free.

United States and Mexico.....\$5.00 a year
Canada.....\$6.00 a year
Foreign Edition, London.....£1 12s. (\$8.00) a year
Single Copies.....15 cents each

Entered at the Post Office at New York as mail matter of the second class.

VOL. XLVI., No. 22.

FRIDAY, MAY 28, 1909.

CONTENTS

EDITORIAL:

The Georgia Firemen's Strike.....	1105
The Burden of Arresting Tramps.....	1105
Opening of Portland Gateway.....	1105
The Railways of the World.....	1106
The Future of the Holding Company.....	1106
The Jacobs-Shupert Locomotive Firebox.....	1107
"Traffic and Transportation".....	1108
New Publications.....	1109

ILLUSTRATED:

The Operating Organization of the Union Pacific and Southern Pacific Systems.....	1113
The Jacobs-Shupert Locomotive Firebox.....	1123
New Union Electric Interlocking.....	1129
Tariff Filing Cases; Pennsylvania Lines.....	1130

LETTERS TO THE EDITOR:

Transcontinental Rates.....	1110
Southern Pacific Mallet Compounds.....	1110
A Track-Walker-Station-Agent.....	1110
Artificial Cooling of Rails.....	1111
Flange Wear on Six-Wheel Trucks.....	1111
Savings Bank Investments in Railway Securities.....	1111

MISCELLANEOUS:

Train Accidents in April.....	1112
Railway Rate Making in Practice.....	1120
The Passenger Rate of the American Railway.....	1127
A. R. A. Report on Car Efficiency.....	1131
English Railways.....	1134

Foreign Railway Notes:

Pukow-Tientsin Railway.....	1133
Swiss Roads.....	1133
Belgian Labor Unions.....	1133

GENERAL NEWS SECTION.....

A strike of firemen on the Georgia Railroad, which was begun last week Monday, resulted, on Sunday, in the complete suspension of traffic throughout the 300 miles of the company's lines, and up to Tuesday night traffic had not been resumed. The strikers are the white firemen of the road who, according to the despatches, complain that ten of their number have been discharged and supplanted by negroes, and they claim that the negro firemen—there are both whites and blacks in this service—are allowed to keep so many good places that their own chances of promotion are impaired; though the negroes are never made runners. The specific demand appears to be that the "oldest white firemen shall stand first for passenger runs, and that passenger, through and local freight, and yard engines be not blocked by non-promotable men;" in other words, that, ultimately, no negro firemen shall be employed on passenger trains. The company insists that its faithful negro firemen shall be protected in their jobs, and has secured men to take the places of the strikers; but these new men were not set to work because of the lawlessness at numerous points along the road. Negroes were pulled off from engines and otherwise maltreated. In some towns "citizens" declared that engines on which there were negro firemen should not pass through. The final cessation of traffic appears to have been due to the refusal of engine-men to start out because of the alleged danger from the

lawbreakers. Outsiders, not strikers, are said to be responsible for this violence, and it seems quite clear that the strike has become important, in the newspapers and in the public mind, simply because it is a race question. That question, with all its rancor, has suddenly flared up as though the whole community were endangered—whereas the Georgia Railroad is not a great establishment. It is said that there are only 80 strikers. Federal Commissioner Neill has gone to Augusta, and he may be joined there by Mr. Knapp, his fellow member of the Federal arbitration board; and quite likely some compromise will be reached before these lines are in print. The governor of Georgia, appealed to by the road for militia, replied that he had not a sufficiently large force to protect so long a railway! The governor made some attempt at a recommendation of arbitration by citizens of Georgia, but General Manager Scott, of the railway, rejected this proposition on the ground that the Federal arbitrators had already taken up the matter. Business has suffered considerably and the mails have been badly delayed; but the situation is different from that in any former case of total suspension of railway traffic by reason of the considerable numbers of automobiles available. These have made many 40-mile trips and longer, carrying passengers and mails.

"Railway detectives are having a hard time to get the officials of the counties in Pennsylvania to take care of the hoboes whom they arrest for train riding. County commissioners of Beaver, Lawrence and Mercer counties have all decided that the county treasuries shall not pay for the keep of the men whom the railways want punished for train riding. The commissioners say that train riders have committed no crime to warrant the county paying the expense of keeping them and that the railways should meet the board bills of the hoboes, as the railways and not the taxpayers get the benefit of arresting them for trespassing."

The foregoing is from the Youngstown (Ohio) *Vindicator*. It states a fact familiar to railway officers everywhere. Tramps endanger the safety of trains and thereby imperil the lives of passengers; do not these county commissioners care? A tramp who applies the air brakes on a freight train to enable him to disembark may thereby easily throw a car off the track and by this wreck, a passenger train on the adjoining track. Tramps who are thwarted in their purposes will beat a trainman or even shoot him; is this none of the county's business? The laws say that county courts shall punish law-breakers, and that county commissioners shall enforce the statutes. Assuming, however, that a county wishes to abdicate and leave its functions to be performed by the railway, what right has a railway to punish a law-breaker? Or to pay his board? It looks as though these Pennsylvania counties—like many other counties in that and other states—were in need of a workhouse, with vigorous officers to make petty criminals earn what they eat.

In ordering the Northern Pacific to make a joint rate and establish a through route with the Union Pacific for passengers traveling from Chicago via the Union Pacific through Portland to Tacoma, the Interstate Commerce Commission makes a distinction between passenger business and freight business that has not to our knowledge been so clearly brought out by the commission before. In the *Pacific Coast Lumber Mfrs.' Assoc. v. Northern Pacific*, 14 I. C. C., Rep. 51, the commission held that since lumber could be shipped from points east of Colorado via the Northern Pacific or via lines affiliated in interest with it to Tacoma, that therefore a satisfactory through route already existed and it was not necessary to order the opening of the Portland gateway. In the case, an abstract of which is given in another column, the commission points out that what might be a satisfactory route for a log is not necessarily satisfactory for a person. In other words, if 8,000 people, as the evidence showed, cared enough about going over the Union Pacific rather than the Northern Pacific as far as Portland to put up with certain inconveniences, such as the rechecking of baggage at Portland,

to arrive at Tacoma, they had a right to a through rate and a right to have the inconveniences of a break in the trip at Portland removed. Chairman Knapp and Commissioner Clark dissented from the majority opinion holding that a satisfactory through route to Tacoma already existed, and that the Northern Pacific had a perfect right to try by all legitimate means to induce passengers to take the 1,000-mile or 1,900-mile trip over its lines rather than the 140-mile trip over its lines and the rest of the trip over a competitor's line. Further, they said that the refusal to grant a through rate with the Union Pacific was a legitimate means of doing this. The whole question is not very important in itself, but as an example of the continual attempt of the commission to go behind the act to regulate commerce and to take into its own hands the management of business which is most obviously the private affair of the management of the railway company, the majority opinion of the commission is discouraging.

THE RAILWAYS OF THE WORLD.

Again the *Archiv für Eisenbahnwesen*, published by the Prussian Ministry of Public Works, issues its statistics of the railways of the world, covering the year 1907, and the nearest year for which statistics are available for the United States and Canada, the year ending with June, 1907. It finds in the grand divisions of the world the following mileages, street railway and some other light railways not being included:

Old World.	Miles	New World.	Miles.
Europe	199,385	North America.....	268,058
Asia	56,294	South America.....	34,911
Africa	18,519	Australasia	17,700
	274,198		320,669

or 594,867 miles in the whole world.

In this division the West Indies are given to South America. All except the island of Trinidad belongs perhaps more properly to North America. They have 2,745 miles. As the figures stand, North America has 34 per cent. more railway than Europe, and nearly as much as the whole of the old world.

Compared with the previous year, Europe increased its railways by 2,917 miles (1½ per cent.), Asia by 1,628 miles (3 per cent.), Africa by 998 miles (5.7 per cent.), North America by 7,637 miles (3 per cent.), South America by 1,380 miles (4 per cent.), and Australasia by 51 miles, or ¼ of 1 per cent. Australasia, besides Australia and New Zealand, includes the Hawaiian Islands with 90 miles of railway. Of European countries, Russia built most railway in spite of its special difficulties, 1,625 miles, as it is likely to do hereafter, because it needs them; France was next with 431 miles, followed by Germany with 411 miles. In Asia British India led with 909 miles, followed by China, 464. In Africa nearly all the progress was in British South Africa, where the addition was 352 miles (5¼ per cent.), the French possessions (including Madagascar) 461 miles (6 per cent.), and Egypt, 183 miles (5¼ per cent.) The *Archiv* gives the increase from 1903 to 1907, which is 6.8 per cent. for Europe, 21.5 per cent. for Asia, 24.4 for Africa, 12.4 for the two Americas and 7 per cent. for Australia.

The growth in Asia and Africa is notable, and the indications are that, in Asia especially, and in China particularly, it will continue. The Chinese now insist in building their own railways, and they are making very clumsy work of it, the art of combination, beyond a certain degree, seeming to be beyond their present grasp, but they at last want the railways, and in one way or another they are likely to get them. In South America, of the 1,380 miles opened in 1907, 894 were in Argentina, 192 in the West Indies, 115 in Peru and 114 in Brazil.

Since 1897 the world's railway mileage has increased 140,137 miles, or 23½ per cent. Asia has nearly doubled its mileage and Africa has gained 65 per cent. Much the largest gain has been in North America, however. The *Archiv's* statistics of the capital invested in railways cover about 85 per cent. of this mileage and show a total of \$41,774,000,000, and if the

other 15 per cent. have cost at the same rate, the world has put over 49,000 millions of dollars into these instruments since George Stephenson was a youth. As the population of the earth is estimated by the best authorities at 1,555 millions, this gives an investment of \$31.50 per inhabitant.

THE FUTURE OF THE HOLDING COMPANY.

It remains to determine the nature and character of the interest embraced in the words: "In which it is interested directly or indirectly. . . . If the words in question are to be taken as embracing only a *legal* interest in the commodities they cannot be held to include commodities mined or owned by a distinct corporation merely because of stock ownership in the carrier.

In the foregoing few words of the commodities decision of the United States Supreme Court—the italics of the word "legal" being our own—is set forth one of the most important if not the most important of the court's findings. It should be added that, a little later in its opinion, the court finds specifically that the word "legal" does *not* hit stock ownership by the railway carrier in the owning company. The railway company may, in fact, control the owning corporation, but such control is not a direct or indirect interest, though the owning company must be a *bona fide* one. It may seem odd to the laical reader, but it is law as interpreted by the highest tribunal in the land. And, as bearing on the future of the many "holding" corporations of the country, the ruling may have great scope unless—a thing not unknown in the outworkings of law—later decisions modify it.

In another part of the finding the court itself refers to "the ambiguity of the statute" and in such matters the layman must of course walk with hesitant tread. Yet one may call attention to the wording of the Massachusetts statute where almost the precise prohibitory words of the federal act are used. The Massachusetts law prohibits a railway company from holding directly or indirectly the stock or bonds of any other corporation and the courts of the state have compelled the New York, New Haven & Hartford to take steps to divest itself—directly and indirectly through a holding corporation—of its Massachusetts trolleys. The long and involved litigation in that state is not ended and there may be a difference in both the application and interpretation of the state act as contrasted with the federal statute. But it looks as though the same principle ran in both and it is no wonder that a high officer of the New Haven company, who probably reflects the opinion of his legal adviser, takes that view, as stated in a press despatch.

But quite apart from the particular case, the commodities decision directs attention to the future of the holding companies and their legal status where an immense field of legal discussion is now opened, including the definition of the words *bona fide*. The holding corporation takes manifold shapes. Sometimes it is a mere agent, at other times a trustee, sometimes—indeed often—a mixture of both. The holding agencies may be in form or effect corporate, or they may not. They may be transitory—like the voting "trust" with its time limit—or permanent. They may be organized to check competition—as in the Northern Securities instance—or for checking speculation. On the other hand they may promote speculation by releasing to the markets the securities of the properties controlled and thrusting them into the limbo of "high" finance—a phase too common with railway properties a few years ago. Holding companies may be responsible or irresponsible, good or bad, and their charters have wide range both in scope and intent. But, in general, they represent the idea of indirection in control and management—for control ultimately spells management as well as the broader and bigger noun, policy.

Upon the word indirection, as the layman reads it, the Supreme Court has now set the hall mark of legality and a railway corporation can control properties by the stock of an intermediary corporate interest and still be inside the law. Certainly such seems, at least, the direct trend of the decision

—and its application is not limited to transportation companies. In this connection also attention may be called to Judge Brewer's opinion in the Northern Securities case, where he emphasized the freedom of investment and characterized it as an "inalienable" right.

We are greatly mistaken if this part of the commodities decision, which bears on outside stockholdings of corporations, and especially on the future of the holding companies, does not reach vast and early import. Its reach and sweep, if taken in its fullness, can lead to no other conclusion. So momentous are they, indeed, that we are not unlikely to see a certain reaction in the courts and legal qualifications and restraints saying nothing of what Congress may enact in the way of modifying statutes—themselves subject to new interpretation by the courts. In its more solemn aspects the regretful feature of the whole situation in regard to both the Hepburn and the Sherman act is its lax of fixity. The Sugar Refining case, the Northern Securities case, the Tobacco case, the Hatters case and now the Commodities case, with their divergent opinions, their confusion of principles, their weakness in the application of the theory of *stare decisis*, while they assert much settle little. The material interests at stake are vast as are the principles of competition and combination involved. But divergent and limited interpretations of courts which themselves not only imply but assert the ambiguities of law, plus the incertitudes of future legislation, leave the situation perplexing, confused, and, for the railway corporations—in the long look ahead—painful. Out of it, of course, must come at last the crystallized law, but not yet, and, we fear, not soon. Meanwhile, such specific episodes as the effect of the commodities decision on the future of holding corporations will be edifying alike for jurists and laymen.

THE JACOBS-SHUPERT LOCOMOTIVE FIREBOX.

Considering the short life of the locomotive firebox with the usual flat plates and stayed surfaces, the expensive repairs necessary on it, its constant leakage and the difficulty of keeping it free from incrustation, it is surprising that so few successful attempts have been made to design a firebox of a different plan. A radical departure from such construction is illustrated in this issue; and Messrs. Jacobs and Shupert, of the Mechanical department of the Santa Fe, should be given credit for their courage and enterprise in working out to successful completion their new sectional firebox. In its design the principal object was to dispense with staybolts, to prevent the destruction of side sheets by expansion, to protect the riveted joints by submerging them, and, by the use of the sectional construction, to prevent the disastrous effects of boiler explosions.

Attempts to dispense with staybolts in locomotive fireboxes have been heretofore in the direction of water tube construction, several forms of such fireboxes have been designed, and some of them used in regular service. In the Roberts water tube locomotive boiler, illustrated in *The Railway Age*, November 23, 1906, the heating surface of firebox and shell is made almost entirely of water tubes. The Brotan locomotive boiler with a water tube firebox, illustrated in *The Railway Age*, May 4, 1906, has been used on the railways of Austria, Prussia and Russia. It is interesting to note that although the drawing of the Jacobs-Shupert firebox shows a comparatively small boiler, the headers along the bottom of the firebox are supplied with water by two 6-in. pipes leading directly to the bottom of the boiler shell, and in the design of these headers, provision is made so that the water shall find as little resistance as possible in passing through. Designs for water tube fireboxes have also been made in this country, and one was patented in 1906 by S. S. Riegel, Chief Draftsman of the Southern Railway, which is somewhat on the plan of the Yarrow boiler as used for torpedo boats.

Other improvements in the locomotive firebox have resorted to the corrugation of the side sheets. The Cour-Castle corrugated side sheet, illustrated in *The Railway Age*, October 25, 1907, has been used on a number of Western roads. The corrugated firebox patented by W. H. Wood, illustrated in the *Railroad Age Gazette*, October 23, 1908, has deep corrugations extending down the sides and over the crown sheet, and in it the side and crown are in one sheet without any seams. The front and back tube sheets are also corrugated around the outer rim beyond the tubes. One of these corrugated fireboxes has been in service on the New York Central for the past six months. In addition to the benefit derived from reduced expansion, it dispenses with 250 to 300 staybolts. Other designs for reducing the number of staybolts are seen in the corrugated tube used in the Vanderbilt boiler and in the Lentz boiler, as used in Germany.

The Jacobs-Shupert firebox was designed particularly for the use of fuel oil, and an important feature is the use of submerged seams, as the ordinary lap seam has a short life when subjected to the intense heat of the oil flame. The corrugated sections have deep curves so that they should have an accordion action and be free from the troubles found with the expansion of the plain plate when rigidly stayed. This flexibility should also be of advantage in allowing the tubes to expand more freely, thus preventing tube leakage. The sectional feature of this firebox will add to its safety and prevent the disastrous explosions which occur when the plain plate is overheated and the water is low.

The principal criticism which has been urged against this firebox relates mainly to the formation of scale and to circulation. In regard to the former, much, of course, depends on the character of the water where it is used. If good water is used, of course, there will be little difficulty from this source. If the engine is run in a bad water district, time alone will determine whether the troubles from incrustation will be serious. A space large enough for a man to crawl through along on top of the crown sheet has been provided by leaving a large opening between the diaphragms at this point and by making the adjacent stayplates pin-connected, so that they can be removed in order to provide a wide space for inspection. Provision is also made for wash-out plugs along the side of each section and by a large open space along the mud-ring at the bottom. This latter space at the mud-ring is in the form of a rectangle 4 in. x 7 in. with the corner cut off with a 3-in. radius. The area of this space is about 25 sq. ft., and through this will be the principal flow of water to the side sheets. This area may be compared with that of the 6-in. pipe supplying the side header in the Brotan boiler, which has an area of 29.4 sq. in. The maximum width of the water space near the mud-ring is about 7 in., and this increases to 8½ in. at the center line of the boiler.

It is supposed that the bulk of the water evaporated by the firebox will circulate vertically, will have an independent flow in each channel and will be supplied from the large opening along the mud-ring. It is also assumed that the flow of water through this opening will be so rapid that the vertical circulation will be amply supplied. The length of life of the channel section will depend on how well these assumptions are sustained in actual practice. The forces tending to produce circulation in the water legs of locomotive fireboxes are comparatively feeble, and the counter currents make the resultant flow of still lower velocity. The velocity of this circulation cannot be compared with that of the water from the boiler check, for there the flow is impelled by the steam in the injector. The numerous diaphragms placed crosswise must also interfere with the longitudinal flow of water at all points above the main opening at the mud-ring. It is not certain what direction the main water currents will take in this firebox nor what their ve-

locity will be. For this reason we have said that in the absence of any definite knowledge on the subject the inventors deserve much credit for the boldness and originality of the design. It seems desirable that some attempt should be made to investigate this feature of the performance of the improved firebox, and it may be done while the experiments relating to the fuel and water economy are being conducted. Such an investigation would throw some new light on the general subject of water circulation in fireboxes. The large volume of water surrounding the channel sections should contribute to the rapid local supply where steam is being generated with unusual intensity, and this may be sufficient for proper circulation.

The initial performance of the locomotive 917, one of the large tandem compounds of the Santa Fe, to which this firebox has been applied, shows that the boiler steams freely and the circulation over the channel sections is sufficient to keep them cool. The more severe test will come when the heating surfaces become incrustated and the resistance to heat transmission is greater. The experiment with this new type of locomotive firebox is an interesting one and deserves to be successful. We hope to publish further information as to its performance, based on the results obtained from the tests which are now being conducted by Prof. H. B. MacFarland, Consulting Engineer, in the mountain region about Needles, Cal.

"TRAFFIC AND TRANSPORTATION."

The original Interstate Commerce Act was really only half a law. It provided that rates should be equal to all, but it did not provide that the service should be equal to all. As long as the persons or the freight were moved between the same points at the same rates the law was obeyed, but a railway could give one person better service than another.

The Hepburn act changed all this; not only must the rates be the same, but everyone is assured the same "privileges and facilities." The change is most important. In railway language, it puts the transportation department under the commerce law. The traffic department had been put under the law by the original act in 1888.

For on American railways there is a division between the men who make the rates, the traffic men, and the men who "run the trains," the transportation men. All through the world these branches of railway work are separated from the engineering departments which build and maintain the roadway and the rolling stock, but only in North America it is usual to make two departments of those in charge of the personnel—separating the "running the trains" or "doing the work"—from the department which "makes the rates."

And it is significant that this purely American department—the traffic department—should rank well up with the others, and indeed often claim the leadership. It makes the rates. Now, outside of America the rates are generally made by the government, and it is no business of mere administration either. This making of railway rates is a legislative function, the Supreme Court tells us, and when a legislature deposes it the deputy commission or court, as it may be, is still a lawmaker. Thus it is held by some who do not think the American way is right that our traffic departments are lawmakers. To this question there are two sides. One may legally be a law to one's self and to others so long as the law of the land is supreme.

This omission in the original act was doubtless intentional. Certainly it was understood, and a good deal was said about the act leaving open competition in facilities, for at that time there were more than there are now who felt that competition was compatible with regulation. They believed, indeed, that competition could be compelled by law.

There was, too, an impression that the traffic department was the only one responsible for undue discrimination. It was

certainly the department which did the rate-cutting, the rebating and the making of midnight tariffs. The transportation department, indeed, was rather apt to play the virtuous brother, especially during the period when the original act was still in the twilight zone, and the courts had not fully decided what it meant.

As the meaning of the law gradually appeared from the haze of legal conflict, the traffic departments found that there were many things which they could not do to secure business, and the transportation departments began to feel more and more pressure to do this, and that to secure new trade or keep old trade. They were asked to hurry up such and such shipments when consignees were in a hurry, to hold back when consignees were not ready, and more especially were they asked to hold goods free in storage and in cars to suit the views of shippers or consignees.

It took some of us ten years and more to realize the change. The Old Timer tells this story: A certain exporter on his line had the choice of two ports at equal rates. He preferred the first of the ports, but there was a car surplus at the first port and a shortage at the second. The railway, of course, preferred to have the shipments made to the second port where the cars were needed, and requested the exporter to use it, which he did. He had forwarded several hundred cars, when it developed that one of the port charges was higher at the second port and his expenses were increased two or three thousand dollars. It was obvious that the railway should make it up, as it had been benefited by the increased car supply, and the Old Timer took it for granted that the traffic department had some device by which this money could be refunded. He found, however, that the law was being interpreted so stringently that the traffic department could not refund in such a case, while the transportation department was quite free to use its best judgment in the collection and refund of moneys due.

"Do you mean," said he, "that the transportation department is the only one which can cut a rate?" And the answer was, "Yes."

It must not be supposed that this situation resulted in any sudden and eager granting of extra facilities, equal or unequal, to the public. Normally, traffic men prefer to make high rates and transportation men prefer to handle business economically, and know well that improved service means increased expense.

The shipping public, however, when it found that concessions could not be secured in rates became most avid of concessions in facilities. Each shipper tried to buy privileges and facilities from railways by the offer of more business or the threat of the transfer of business to rival lines. Such pressure is hard to withstand and in the pressure some people were hurt, or thought they were hurt. As a result the law was changed.

Every carrier is now compelled to file with the Interstate Commerce Commission, in Washington, tariffs showing not only rates but all "privileges and facilities" covered by the rates. Further, the Commission may forbid such arrangements if they are unfair or unreasonable and prescribe reasonable arrangements.

This is an immense subject and its working out will involve an immense amount of time and work. There are no decisions by the courts as yet to tell us just where the line is to be drawn, but the railways have made an effort to get into print all of their "privileges and facilities" which are of importance, and the Commission has considered some of them formally and many others informally. Better yet, in recording these privileges and facilities the railways have done their best to provide them to all alike without undue discrimination.

These privileges do not largely apply to passenger service. They do apply to freight, and generally to freight in large lots. A few of these privileges apply to freight in transit. The right of "reconsignment" is one and "milling in transit" another.

The right of reconsignment is exercised when a shipper with a number of markets ships freight before it is sold with the right of naming the destination when the freight reaches some intermediate point. "Milling in transit" originally applied to grain shipped to the seaboard. It is exercised when the grain is stopped at a mill en route and ground into flour. It was followed by a brood of privileges; "compressing in transit" for cotton; "planing in transit" for lumber, and the like.

It must be confessed that privileges of this sort do not flourish in the light. It may seem advisable to give such a privilege in return for important shipments, but when it becomes an open matter of course it is usually recognized as a service for which payment should be made.

Most of these privileges and facilities, however, are in some way connected with terminals and concern the freight before it starts on its journey or after it arrives. For this reason it is urged that they are local privileges and can only be regulated by the states. This point has not been fully decided by the courts, but so far the Hepburn act has been upheld and the railways are submitting to it. They have found, indeed, that the Interstate Commerce Commission can handle such matters better than 46 states can.

These local privileges in some localities involve even the draying of freight—store door delivery, as it is called. At some seaboard points they involve the delivery of freight in boats. At many others methods of loading, unloading and transshipment are involved, but everywhere are present the questions of storage and car demurrage.

The carrying out of the law would be hard enough if it undertook only to prevent undue discrimination between people similarly situated, but it undertakes to forbid any undue preference to any locality by any railway. Our railway systems are so great and so interlaced that the enforcement of this provision should bring about a tendency to uniformity in all such privileges throughout the country.

And here is a difficulty which may make the law very unpopular in some parts of the country. It will be impossible to make these privileges uniform without hurting some one. The privileges are much more liberal in some places than others. The railways would like the liberal privileges withdrawn. The public would like the liberal privileges extended over the whole country. Compromises will have to be made and compromises which involve the giving up of privileges are unpopular.

The car demurrage question, for instance, which has been taken up seriously involves compromises of this kind. It is quite usual throughout the country to allow two days for the loading or unloading of a freight car. In certain localities more time is allowed. The compromise which is finally made will be popular in the localities that gain something, but unpopular where the time is reduced.

The Commission has, therefore, a tremendous task ahead of it in investigating these privileges and facilities reported to it by the railways and determining whether or not they are fair to the different localities. It will be under the great disadvantage that no locality will want to give up its pet privileges. It is conceivable, indeed, that certain small localities with peculiar privileges will seek to conceal them. It will take the determined effort of years to bring into line the "privileges and facilities"—perhaps as many as it took to line up the rates.

NEW PUBLICATIONS.

Official List of Open and Prepay Stations, No. 2. A complete list of freight stations on approximately 450 railways, showing stations having agents in charge, stations at which freight charges must be paid and their geographical location, together with full notes.

The volume at hand contains 321 pages of statistical matter divided into two parts, the first part treating of stations in alphabetical order, and the second part of stations alphabetically arranged under the name of the railway company on

which they are located. The name of each station is accompanied with full notes, giving particulars of value to shippers. The book is issued as of May 1, 1909, under special permission of the Interstate Commerce Commission by F. A. Leland, agent of the lines covered at St. Louis, Mo. It contains much information which it would be troublesome for a shipper to get in any other way.

How to Use Slide Rules. By D. Petri-Palmedo, second revised edition. Price, 50 cents. Kolesch & Co., 138 Fulton street, New York; 65 pages, 7 in. x 4 in.

The second edition of this concise little book on the use of the slide rule, besides containing the information given in the first edition, has an amplified chapter on the triplex slide rule, and chapters have been added describing the Nestler Precision rule and the Stadia rule. These rules are modifications of the Mannheim rule, which is fully described. The book, while not going into nearly as much detail in describing the manipulation of the slide rule, gives sufficient examples of its use for the principal calculations for which it is ordinarily used. The descriptions and examples are in a particularly concise form, which necessitates close attention in studying them, but if this attention is given it will be found that the necessary information is all there.

Laboratory Experiments in Metallurgy. By Albert Sauveur and H. M. Boylston. Published by the authors: Cambridge, Mass. 73 pages, 8 in. by 10 in.; 17 illustrations; cloth.

This book consists of a series of notes giving rather minute directions for the performance of certain experiments in metallurgy, and is intended for the laboratory use and guidance of students. It was written for those of Harvard University who are taking courses in general metallurgy and in iron and steel.

For the student these notes ought to be invaluable, because they are so full and complete that by following them the desired results can surely be attained. The first part, dealing with general metallurgy takes up the work of coking and the proximate analysis of coal, calorimetry, pyrometry, the determination of melting points, and the reduction of lead, copper and iron oxides. In the second part, the work is somewhat more elaborate and enters into the determination of the influence of carbon on iron, the thermal critical points of steel and the relation between the critical points and the hardening properties, and this work is extended to embrace the influence of the quenching bath in the tempering of steel and the effect of annealing.

Each item is handled separately and with fulness of detail. Thus: in the proximate analysis of coal, with which the book opens, a complete and concise description of the apparatus is followed by instructions for each step in the process until the final results are obtained, and this is done in such a way that any intelligent person should be able to do the work without difficulty. The same holds true of the balance of the work. After each experiment one or more pages of blank forms are given for laboratory reports, so that not only will be instructions, but the results be contained between the same covers.

The book also contains a number of tables, such as typical analyses, thermochemical data, hardness factors, and the like, so that it is of value not only to the student, but to engineers who wish to gain an idea of the general methods used in metallurgical work of this character.

The Application of Highly Superheated Steam to Locomotives. By Robert Garbe. Edited by Leslie S. Robertson. New York: Norman W. Henley Publishing Co. 70 pages; 6 in. by 9½ in.; 22 illustrations. Cloth. Price, \$2.50.

This book is a reprint of a series of articles that appeared in *The Engineer* of London, and is an important contribution to the literature of the use of superheated steam on locomotives, not only because of the clear statement of the case but from the position and experience of the author, whose work on the state railways of Prussia is well-known. The ground is taken that a moderate amount of superheat is useless and the reasons therefore are set forth. The work that has been

done is outlined, and the special troubles that have to be guarded against are given in some detail. There is an outline description of the several typical superheaters in use, and their individual advantages are stated.

The book is characterized by its plain speaking and the author does not hesitate to name names and to commend or condemn as he thinks the case may require. For example, in dealing with the Pielock superheater he calls marked attention to the weaknesses of the design; to the dangers of overheating the tubes; to the difficulties of removal, renewal and cleaning; to the lowering of the tensile strength and the consequent liability to fracture when at a blue heat, and the loss of superheat by the passage of the steam through the steam space of the boiler, so that "only a very moderate degree of superheat can be obtained." He also objects to the smokebox superheater because of the blocking up of the tube-sheet on the smokebox side.

The book closes with a description of some of the details of the valve and driving mechanisms that must be especially adapted to the use of superheated steam. The standing of the author is such and the position which he takes is so important that a further discussion of the matter will be presented in a later issue.

Letters to the Editor.

TRANSCONTINENTAL RATES.

New York, May 18, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I have read with a great deal of interest your article reviewing the matter of transcontinental rates, particularly with regard to rates to points on the line, such as Spokane, and I must say in response that while you have presented the matter in good form, I am not altogether convinced of the practical advantage of such a rate basis as is in force. The idea may be theoretically correct, but is it a wise policy?

I enclose a clipping from a recent number of your paper, in which it is pointed out that freight can be shipped from a point in Utah to Los Angeles and back over the same rails to an eastern destination cheaper than it can be shipped East direct. Is not such a circumstance a constant incentive to anti-railway agitation, and so is not the theoretical advantage to the railway companies of some extremely wise pieces of rate-making nullified?

You know we do not all do all that we have a right to do. There has to be some recognition of "policy," of cause and effect, and some medium course, conciliatory, if you please, generally brings a better result than a strict adherence to our rights or to a theoretical policy. It seems to me that absurd rates, or apparently absurd rates, have had a very detrimental effect upon sentiment, and that popular impressions should be taken into consideration in a matter of this sort, for few of the public at large have the opportunity to study the matter along the lines set forth in your article.

You would be clearly within your rights should you establish a subscription rate of \$1 per annum for some selected class of the community, and no doubt could justify, theoretically, such a rate; but would it not be a constant thorn in the side of these who were paying the regular rate, and so be an unwise course?

Perhaps these random thoughts upon a large subject may suggest to you something in the way of "testimony in rebuttal."

F. W. SAWARD,

General Manager, *The Coal Trade Journal*.

[If rates had been kept on an out-and-out distance basis, there wouldn't be much of any United States west of the Mississippi river. If they were based on ocean competition levels as a maximum, the transcontinental lines, with their

hundreds of miles of bridge-like traffic across non-productive regions, would all have been starved to death long ago. The rate fabric is immensely complex, and in its present form it represents the best thought of many able men. Yet we suppose it can never be made wholly satisfactory to all the people that have to do business under it.—EDITOR.]

SOUTHERN PACIFIC MALLET COMPOUNDS.

Wellington, Kan., May 14, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Referring to the Southern Pacific Mallet articulated compound locomotives as described in your issue of April 30, you say on page 937:

"The track ahead is entirely out of sight and cannot be seen at all on a tangent from inside the cab; by leaning well out of the window it may be possible to see it, etc."

You also say later on, in referring to the engine in general, that "It is a bold piece of work and well worthy of all the attention that it will receive." Why not make the design a little more bold, covering the smoke arch with asbestos lagging and steel jacket, and put the cab over and alongside of same, giving the engine crew a chance to see where they are going? I can see no good reason why the cab should not have been built over the low-pressure cylinders. The injectors can be located at the smoke-box just as well as at the rear end of the engine, and the oil-burning apparatus can be controlled from the cab so located without any difficulty. Water glass and gage cocks can be arranged each side of the smoke arch by means of pipes, so that both engineer and fireman can see the water level, as in steamships, where the water glasses are in the engine room in plain sight of the water tender. The fireman might have to go to the rear of the boiler occasionally, to sand out the flues when necessary. The throttle and reversing gear can be operated from a cab so located, as well as from a cab in the old orthodox location. I don't think there is any excuse for locating engineers on locomotives so they cannot see the track at all times unobstructed by the engine itself.

HUGO SCHAEFER,

Master Mechanic, Atchison, Topeka & Santa Fe.

A TRACK-WALKER-STATION-AGENT.

Albany, N. Y., May 20, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

In your issue of May 7, under title of "How to Discontinue a Station," you discuss editorially, with some irony, the order of the Public Service Commission, Second District, in the matter of the petition of the New Jersey & New York Railroad Company, which was, as you put it, "to discontinue its station at Union, Rockland county." Irony should be based on facts, and as you appear to have been misinformed, allow me to set you right in some particulars. The application was not to discontinue the station, but was as follows (I quote from the petition):

"Wherefore your petitioner prays that the commission grant its consent . . . to the discontinuance of said station for the reception or delivery of freight; . . . your petitioner intends to discontinue the station agency, but to maintain said station as a flag stop for passengers, providing sufficient accommodations for the protection of passengers awaiting trains."

The application was opposed and a counter-petition placed before the commission signed by some thirty residents of the vicinity, asking that the petition be denied. On the hearing the station supervisor of the railway stated in answer to questions "that if the stop at Union for the receipt and delivery of freight is discontinued as requested in this petition, the local freight will be billed to Spring Valley, while the carload freight would be billed to Spring Valley, Union Switch. In fact, it would be the same, as far as carload lots are concerned, as at the present time, and if the petition in the present proceeding is granted and the station stop at Union is allowed to be discontinued, it is proposed to stop the trains

at Union the same as at the present time. So far as the passenger traffic is concerned there will be no difference; the only thing is there would not be tickets sold at that point, but trains will be stopped on signal at that point. Practically the only difference in handling of the freight business would be in the local freight at Spring Valley. The agent at Spring Valley would make the collections."

Q.—Do you propose to keep the waiting-room open for the accommodation of passengers?

A.—Yes, sir; the waiting-room open.

Q.—Keep it warm?

A.—Yes, sir.

Q.—Who will do that?

A.—The track-walker.

Q.—How would the freight be delivered in less than carload lots if requested?

A.—It would be unloaded at Spring Valley.

Q.—Would it ever be sent if requested if it were household property or something of that kind?

A.—It would if it were a half carload of lumber, or something like that which would not be stolen, but any feed or such stuff like that would be unloaded in the freight house at Spring Valley.

You will therefore see that the restrictions upon which you comment were imposed by the railroad itself as conditions upon which it should be allowed to discontinue the use of the station as a shipping and receiving point for freight and as a selling point for tickets; in other words, that the services of a regular agent at Union could be dispensed with. The company has another station—Spring Valley—located seven-tenths of a mile from Union.

The commission welcomes at all times criticisms from a journal of the standing of the *Railroad Age Gazette*, but I think you will agree that such criticism should in all cases be based upon the facts.

JOHN B. OLMSTED,
Commissioner.

ARTIFICIAL COOLING OF RAILS.

Crafton, Pittsburgh, Pa., May 25, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

"No artificial means of cooling the steel shall be used after the rails leave the rolls" is a requirement embodied in the rail specifications published in the *Railroad Age Gazette*, May 21.

To be valuable as an aid to prove that the distribution of metal in the proposed sections will obviate the necessity of artificial means, and simultaneously serve as a safeguard against misleading mill practices—to get out the section, this specification should state that no artificial means of cooling the steel shall be used *before, during conformation and after* the rails leave the rolls. Nor is this the only requirement absolutely necessary, in view of new methods intended for rolling rail in the future.

A. W. HEINLE,
Metal Rolling Engineer.

FLANGE WEAR ON SIX-WHEEL TRUCKS.

Chicago, May 21, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

There seems to be a rather general impression among those who have not specialized on the subject that the middle wheels of a six-wheel truck develop less flange wear than the other wheels in the same truck. Investigations of tire templates of 44 middle wheels and 91 outside wheels show that the relative flange wear on the middle wheels is somewhat in excess of that on the outside wheels. These results were obtained from cars in similar service on a large road running into Chicago. The tire templates were taken with great care, wear areas measured with planimeter and reduced to a common basis of area worn per 1,000 miles.

Some reasons for the condition of wear cited are apparent upon consideration.

On curves of short radius the outer extreme wheels of each truck tend to force the flanges of the inner middle wheels against the rail. Two flanges act against one. This condition exists regardless of speed, and would seem to become

manifest when the curve radius approaches 700 ft., which corresponds roughly to an 8-deg. curve. As the radius decreases, the binding becomes more marked until a point is reached where the wedges of the middle wheels on the inside of the curve will jump out of position.

It would also seem that the flanges of the middle inside wheels would suffer even on a curve of comparatively large radius if the outer rail were elevated too much for the speed.

Some relief will undoubtedly be experienced by allowing increased lateral movement between the brass and the axle, either on the middle wheels or on all of the wheels. This arrangement was not in force on the cars above referred to. Inquiry of one large road where the practice is to use brasses slightly shorter than M. C. B. standard elicits the information that it thereby does away with excessive flange wear on the center pair of wheels in a six-wheel truck.

EDWIN S. WOODS.

SAVINGS BANK INVESTMENTS IN RAILWAY SECURITIES.

New York, May 11, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Referring to the article on savings bank investments in railway securities, which appeared in your issue of April 30, the whole theory on which this legislation has been based appears to me to be radically wrong.

Most of the states require that only the bonds of railway corporations can be purchased which have paid dividends of not less than 4 per cent. for a series of years. If a corporation should happen to be earning 10 per cent. on its stock and puts all of this back into the property and thus improves the value of the security, the bonds are not considered as safe as if the company distributed this money among the stockholders.

Another peculiarity of this dividend theory is the minimum of 4 per cent., which in most states is required to be paid on an amount of stock which shall be not less than one-third of the bonded debt. The bonds of a company like the New York, Ontario & Western, for instance, which pays 2 per cent. dividends on a capital stock which is equal to more than twice of its total funded debt, are not legal, although this company disburses in dividend payments about three times the amount necessary if its capitalization were differently arranged, and on a basis which would make them legal.

More examples of this crude legislation are the cases of companies which pay dividends on their preferred stock, and where the preferred stock equals more than one-third of the bonded debt, but whose bonds are excluded because there happens to be an additional equity consisting of common stock which does not receive any dividends. Reference is made to the type of such cases as is represented by the Alabama Great Southern.

At the request of a number of banking and insurance people I prepared a bill on this subject, which was introduced at the last session of the Connecticut legislature. In that state there has been a great deal of dissatisfaction not only with the existing law, but with the method which has been pursued for the last few years of enacting special legislation, admitting such specifically named issues, which has led to bad results and charges about undue influence, etc.

It was my aim to frame a law which would absolutely exclude all inferior or doubtful securities and would admit as many absolutely safe bonds as possible. The essential features of this proposed law were that no railway bonds would be admitted, secured on lines less than 100 miles long, or earning less than \$1,000,000. Furthermore, the fixed charges of the company should not exceed 20 per cent. of its gross earnings. There were further provisions that, as is now customary in mortgages which provide for additional bonds for improvements and extensions, the company must have earned the interest, not only on all the bonds which

have been issued and 50 per cent. in excess thereof, but also on all the bonds which were to become issuable thereafter. The companies had to pass through this test for five years.

The purport of this provision is, of course, to exclude small companies, whose earnings would be largely derived from lumber or some mineral product, where the business might fall off.

The provision which excludes the bonds of companies which have fixed charges greater than 20 per cent. of their gross earnings is intended to cover the case of over bonding, where the earnings might be only temporary. The equivalent of this provision is the exclusion of companies whose bonded debt is more than five times the annual gross earnings, capitalized at 4 per cent.

The act in question also admitted equipment bonds of corporations which met with the previously mentioned requirements, if there was an equity of 20 per cent. paid in on such equipment. The act deals separately with large corporations whose annual gross earnings exceed \$25,000,000 and whose annual net surplus is in excess of \$5,000,000, and admits debenture bonds which contain the mortgage clause; that is, a provision that such debentures are to be co-equally secured with any future mortgage.

This latter provision was a little ahead of the times, but was inserted because it is the writer's view that most of the financing done by the large corporations hereafter will be done on such debentures which have no specific lien. This method is popular in Europe; it is almost exclusively employed in Great Britain and is becoming customary in the New England states and is gradually spreading over the country.

Public prejudice to the contrary notwithstanding, collateral trust bonds, which are secured by the deposit of first mortgage bonds, are just as good as direct first mortgage bonds; no better and no worse, and if the bonds which form the security should comply with the requirements of an act, the fact that they are deposited against some other issue should not be a bar to the collateral trust bonds themselves. As a matter of fact, a collateral trust bond has a great many features which from the investor's point of view make it more attractive than first mortgage bonds. Take for instance, in the case of Texas: There the law requires that a railway company must be incorporated under the laws of the state. It has become customary in the case of Texas corporations to issue all the bonds and stock of a company and deposit same with some trustee in the East, and issue against these securities a series of collateral trust bonds. In case of default the bondholders have the whole corporation and can reduce the collateral to possession by putting it up at auction in New York or Pittsburgh, etc., and do not have to submit themselves to the irksome law, delays and legal expenses of a foreclosure suit in a distant state. They can keep the collateral intact and issue a new series of securities at a minimum of expense. This method was pursued in the case of the Denver & Southwestern Railroad a few years ago, and worked very satisfactorily.

In view of the fact that the state of Connecticut admitted several issues of terminal bonds by special legislation, the provision was inserted to cover terminal bonds in general, with the restriction, however, that they must cover property in cities of not less than 100,000 people, and must be guaranteed or its facilities leased to some strong railway corporation, whose own bonds are admissible under the law. This provision was intended to cover the emergency, where some comparatively small corporation might attempt to carry the burden of a big terminal, as for instance in the case of the Wheeling & Lake Erie and Wabash-Pittsburgh Terminal and the old Chicago & Northern Pacific Terminal, etc.

The matter of street railways has aroused considerable discussion on part of investors as well as bankers, as many people believe that the business of street railways in large cities is about as permanent as possible. Undoubtedly the

business is permanent, but whether the profit on same at a fixed rate of fare is likewise permanent is quite another question. For this reason the requirements for street railway bonds were much more tightly drawn, it being necessary for a street railway to show an earning ability of twice its interest charges on all the bonds issued and issuable thereafter.

In order to avoid the question of doubtful franchises no street railway bonds are admissible under the act, unless the company files a statement from the Mayor or other proper officials of the city in which the company operates, that the finances and that legislation shall be based on the sounder the maturity of the bonds.

No action was taken by the Connecticut legislature on this subject, but presumably it will come up again two years hence. In the meanwhile it is to be hoped that there shall be a more general understanding on the subject of railway finances and that legislation shall be based on the sounder principles of surplus earnings rather than on surplus disbursements. "Private credit is based on the borrower's earning capacity and character and not on his spending powers. Why should this rule be reversed when applied to corporations?"

F. J. LISMAN.

Contributed Papers.

TRAIN ACCIDENTS IN APRIL.¹

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of April, 1909. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the cases of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

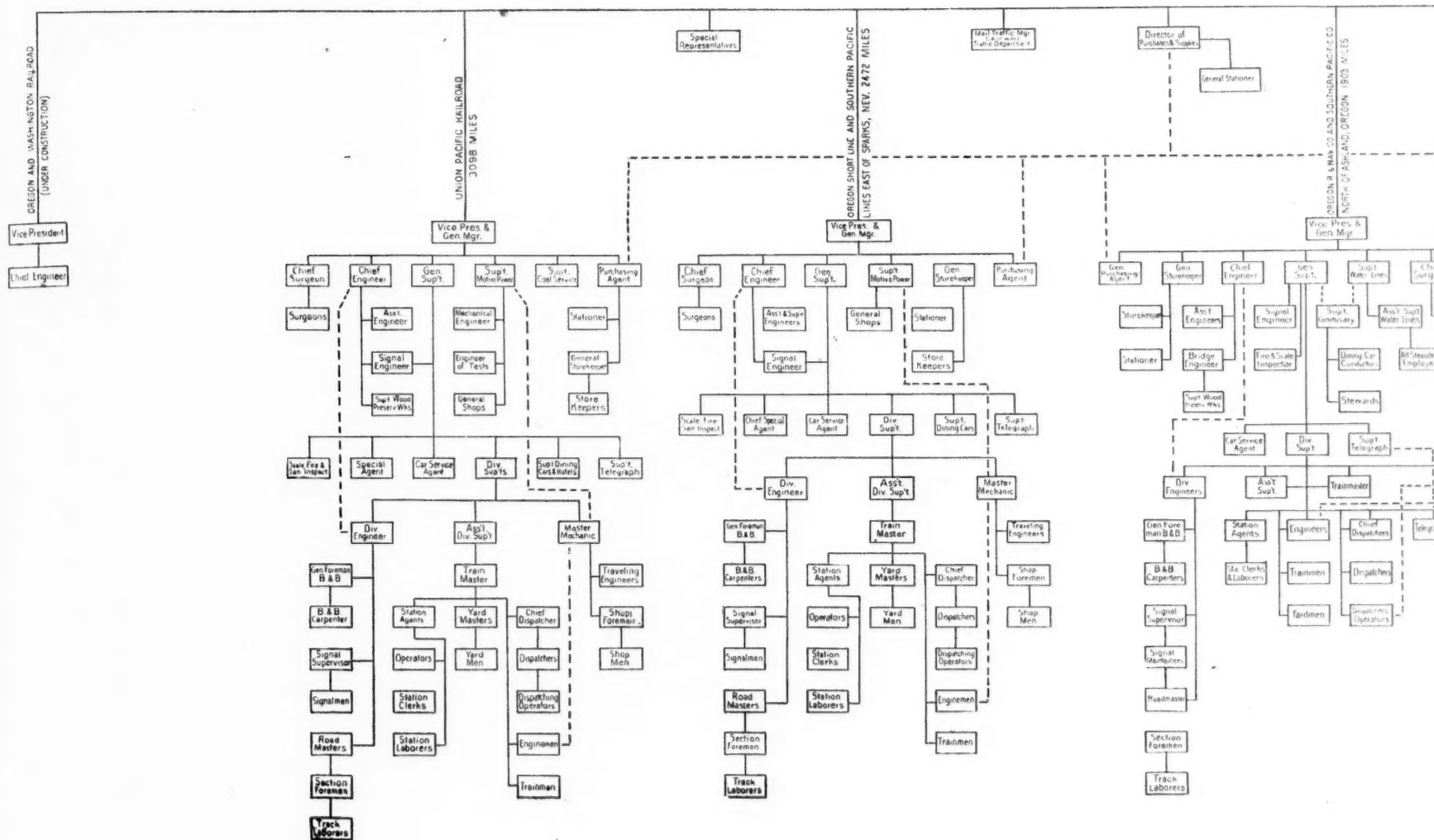
TRAIN ACCIDENTS IN THE UNITED STATES IN APRIL, 1909.

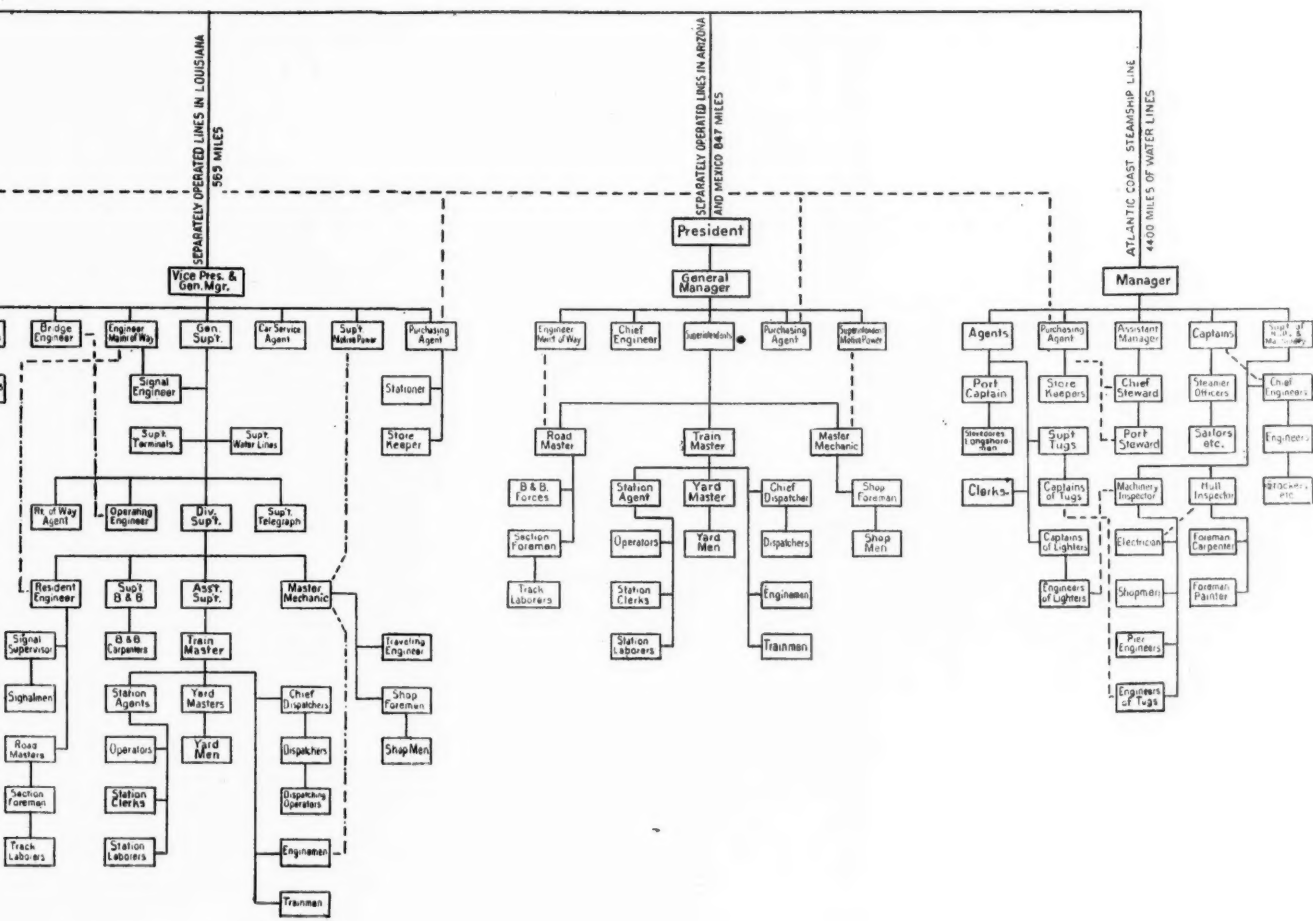
Collisions.							No. persons reported	
Date.	Road.	Place.	Kind of Accident.	Kind of Train.			Kil'd.	Inj'd.
8.	Bess. & Lake E.	Houston Jctn.	rc.	Ft. & Ft.			1	3
19.	Cent. of N. J.	Com'paw Ave.	rc.	P. & P.			0	9
19.	Cent. of N. J.	Com'paw Ave.	rc.	Ft. & P.			0	1
20.	Nor. & Westn.	Roanoke.	xc.	P. & Ft.			1	7
21.	Tex. & N. Or.	Mahl.	bc	P. & Ft.			0	7
Derailments.							No. persons reported	
Date.	Road.	Place.	Cause of dermt.	Kind of train.			Kil'd.	Inj'd.
5.	Den. & Rio G.	Colorado Spgs.	d. switch.	Pass.			0	13
9.	Central Ohio.	Nashport.	unx.	Ft.			1	0
10.	Seaboard A. L.	Hick's, S. C.	ms.	Pass.			0	8
10.	Nor. Pac.	Bristol, Wash.	unx.	Pass.			2	9
12.	Chic. & Alton.	Mayview.	wind.	Pass.			0	0
15.	Phila. & Rdg.	Harrisburg.	d. brake.	Pass.			2	4
17.	Den. & Rio G.	Dolores.	d. bridge.	Ft.			1	0
19.	Grand Trunk	Grand Rapids.	washout.	Ft.			4	0
22.	D. L. & W.	Craigs.	d. rail.	Pass.			1	2
29.	Bost. & Albany.	Palmer.	b. rail.	Pass.			0	6

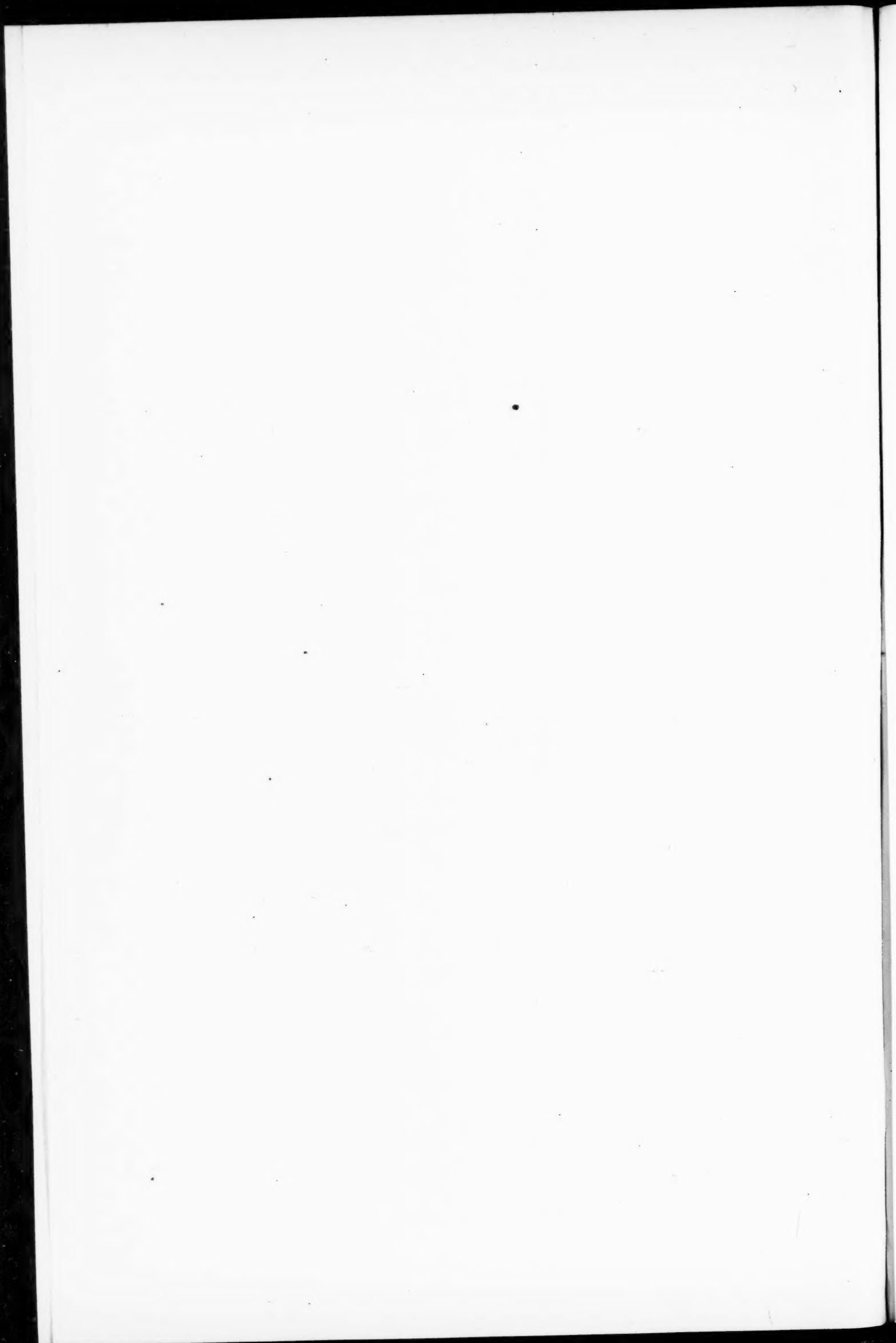
The derailment near Bristol, Wash., on the 10th, is reported as due probably to some defect in the engine or the tender, as the track was in perfect order; but the case has to be classed as unexplained, as no evidence was discovered of anything having been wrong before the engine left the track. The engine was completely overturned and the mail car slid down the bank at the side of the track and lodged near the edge of a river. The train had just entered a sharp curve at full speed. All of the cars in the train, except one, were derailed, yet only two passengers were injured seriously.

Of the half dozen electric car accidents reported in the newspapers in the month of April, one, a derailment, reported from Canton, Ohio, resulted in one fatal injury.

¹ Abbreviations and marks used in Accident List:
rc. Rear collision—bc. Butting collision—xc. other collisions
—b. Broken—d. Defective—unf. Unforeseen obstruction—unx.
unexplained—derail. Open derailing switch—ms. Misplaced switch
—acc. obst. Accidental obstruction—malice. Malicious obstruction
of track, etc.—boiler. Explosion of boiler of locomotive on road
fire. Cars burned while running—P. or Pass. passenger train—F.
or Ft. freight train (includes empty engines, work trains, etc.)—As-
terisk. Wreck wholly or partly destroyed by fire—Dagger. One or
more passengers killed.







THE OPERATING ORGANIZATION OF THE UNION PACIFIC AND SOUTHERN PACIFIC SYSTEMS.*

[WITH AN INSET.]

BY JULIUS KRUTTSCHNITT.

Upon assuming the presidency of practically all the corporations comprising the Union Pacific and Southern Pacific systems, E. H. Harriman was confronted with the problem of designing an organization that would economically and efficiently supervise their operations. The mileage of the various rail and water lines is as follows:

Rail Lines.				
	Miles of road.	Second track.	Yards and sidings.	Miles of track.
Union Pacific	3,338	437	1,187	4,962
St. Joseph & Grand Island.....	258	...	56	314
Oregon Short Line.....	1,454	5	421	1,879
Oregon R. R. & Nav. Co.....	1,427	...	250	1,677
S. P. Co.—Pacific System.....	6,015	191	2,094	8,299
Sonora Railway	263	...	28	291
Sunset-Central Lines	3,442	45	990	4,478
Mexican and Arizona Lines....	319	...	47	365
Mexican Extensions	528	...	87	615
Total	17,044	678	5,159	22,880

Rail Lines Owned Jointly.				
	Miles of road.	Second track.	Yards and sidings.	Miles of track.
U. L.—Leav. & Topeka Ry... ..	47	...	3	50
U. P.—Miscellaneous.....	...	...	14	14
U. P.—San Pedro, L. A. & S. L. R. R.....	1,066	...	279	1,345
S. P.—Sunset and Sunset Western R. R's.....	48	...	7	55
S. P.—Northwestern Pac. Ry.	406	10	107	522
Total	1,567	10	410	1,986
Grand total, rail lines.....	18,610	687	5,569	24,867

Water Lines.		Miles.
Atlantic steamship lines		4,400
Pacific steamship lines		31,200
Total, water lines.....		35,600
Grand total, rail and water transportation lines.....		54,210

One can leave New York on a Southern Pacific Company steamship, transfer to the Sunset Lines at New Orleans, board a Pacific Mail steamer at San Francisco and land at Hong Kong, a total journey of 9,902 miles, without leaving Harriman lines. On the completion of the lines now under construction between Seattle and Portland, and between Culiacan and Guadalajara, Mexico, a traveler will be able to make a continuous trip on Harriman rails from Seattle, in latitude 47 deg. 30 min., to Guadalajara, in latitude 22 deg., a distance of 3,169 miles; or from Seattle to New Orleans, a distance of 3,441 miles.

In reconstructing the Union Pacific to make it not simply a good line but the best that could be built from the Missouri river to the Salt Lake valley, and later in making the Southern Pacific the best line that could be built from the Salt Lake valley to the Pacific coast, Mr. Harriman was a pioneer. In designing an organization to meet the extraordinary conditions then confronting these great systems he was likewise a pioneer. Mr. Harriman solved his problem of organization by the creation of two unique positions, Traffic Director and Director of Maintenance and Operation, located in adjoining offices in Chicago and both reporting to himself as president in New York. To these two staff officers, each within his defined sphere of duty, he delegated the administrative control and supervision of the Atlantic Steamship Lines and of all completely owned rail lines save those in Texas where the law requires a local vice-president to report directly to the president. Mr. Harriman is a firm believer in team work, and in turning over the management of the properties to his two co-ordinate representatives in Chicago, with the injunction that on them rested the responsibility for net results, he struck the keynote of the entire organization. From the Chicago office down to the division offices, the traffic officers co-operate as loyally to secure low operating results

as the operating officers do to promote business and secure new traffic.

The accompanying chart shows in detail the operating organization under the director of maintenance and operation, who acts as assistant to the president for the Louisiana lines. In the traffic department the organization is analogous, there being for each unit and reporting to the traffic director traffic officials co-ordinate with the vice-president and general manager, and under them division traffic officers co-ordinate with the superintendent.

The theory of the organization is that the different properties must be brought into close relationship with each other, yet preserve a full measure of autonomy. It is intended that a superintendent shall be the general manager of his division; and the general manager, in turn, be the responsible operating head for the property. The director of maintenance and operation has charge of all new construction. The general managers are responsible for new construction in their respective territories. In the building of new branch lines, location and grading are usually under the immediate direction of the respective chief engineers. The superintendents do not become responsible until the track-laying stage is reached, and sometimes not until the track is completed.

In the opinion of competent, disinterested critics, the results obtained by this unique organization in its five years of existence have vindicated the wisdom of its creation. The organization of the various component operating units is not essentially dissimilar from that of other railways which follow the divisional plan. This paper deals with the functions of the office of the director of maintenance and operation, which standardizes and correlates, supervises and investigates, commends and criticises, equalizes and differentiates as among different properties, but leaves each to work out its own problems of administration. Its non-interference with details is shown by the fact that comparatively few positive instructions have to be given.

STANDARDIZATION.

The management of the properties is vested in seven operating vice-presidents, each of whom, with his corps of assistants, is working out solutions of problems on his lines which are common to all. A study of seven solutions of the same problem must necessarily demonstrate that one of the solutions is the best.

Sometime, somewhere, was written by an Arabian sage:

"He that knows not, and knows not that he knows not, is a fool—shun him;
He that knows not, and knows that he knows not, is simple—teach him;
He that knows, and knows not that he knows, is asleep—rouse him;
He that knows, and knows that he knows, is a wise man—follow him."

Our theory of standardization is simply, by frequent conference, to find the wise man "that knows, and knows that he knows," and having found him, to "follow him."

W. V. S. Thorne, our director of purchases, outlined at your meeting in February, 1908, our general policy of standardization and its economical effect upon his branch of the work. With a view to systematic working out of details for standard practices and uniform devices, the general superintendents, the superintendents of motive power, the chief engineers and the signal engineers meet in semi-annual conferences. These meetings, whilst separately organized for each branch of work, occur simultaneously in the same city, so that some joint sessions may be held to discuss overlapping subjects of common interest. Appropriate committees are appointed to initiate or consider details. The minutes of the various parent bodies have the force of recommendations and contain a recorded vote of the members whenever action is not unanimous. These minutes are forwarded through the various general managers, who append their own frank comments and criticisms. The director of maintenance and operation approves these minutes wholly or in part. Recommendations so approved become the standard and remain the standard until

*From a paper read before the New York Railroad Club, May 21.

otherwise ordered. After a fair trial, any officer or employee is at liberty to re-open the subject and to suggest through the proper channels a substitute or modification. Initiative is preserved by leaving the meetings untrammelled. They are legislative bodies assisted by the individual general managers as expert advisers and subject to the approval or veto of the director of maintenance and operation. A very large percentage of such action of the director is confirmatory; only a slight portion is nugatory. Still another part consists in referring back for further consideration questions on which there is too marked a divergence of opinion. When time does not permit awaiting the semi-annual meeting, a mail vote is taken through the general managers.

In this way, the general superintendents have, among other things, formulated a book of rules to supplement the standard code of train rules of the American Railway Association. The maintenance of way engineers and general superintendents have produced a book of maintenance of way rules. The signal engineers have standardized their work in accordance with the most approved American practice. On the superintendents of motive power has fallen a heavy burden in standardizing machinery, methods, designs, cars and the countless details of construction and repair. Where the Master Mechanics' and Master Car Builders' Associations necessarily leave discretion to individual roads, our superintendents of motive power necessarily co-ordinate individual preferences. The chief engineers and maintenance of way engineers have standardized all plans for bridges, trestles, culverts, track structure and buildings. Regardless of convenience, the commercial value of standard metal spans is estimated to save 10 per cent. in original cost, to which must be added the elimination of unnecessary metal. One of the roads in the system was using a form of truss much older and complicated than our standard, which required 20 per cent. more material with the same unit stresses, for its construction to carry the same load. The various meetings, either separately or concurrently, are standardizing and reducing the number of reports and printed blanks.

It must not be understood that the standards are so inflexibly maintained as to check improvement and initiative. Every officer and employee concerned knows that suggestions and criticisms are welcome, and as soon as proof can be offered that a new device or practice is better than the old its adoption quickly follows. Our plan requiring all officers concerned to vote on the adoption of a new device certainly curbs costly and ill-considered experiments. Nothing in our policy forbids experimenting with new devices, but it does forbid their adoption and use on a large scale until their merit has been thoroughly demonstrated to the satisfaction of all the general officers interested. Our officers appreciate that they are working out an experiment in railway operation, and the knowledge that a new idea or successful device of any sort, if proven successful, will be adopted as standard practice on all of the Associated Lines acts as a powerful stimulus to originality and initiative.

The practical benefits of standardization are apparent in many ways. The ability to order in large quantities standard articles, free from a capricious variety of details, makes possible a reduction ranging from perhaps 10 per cent. to 30 per cent. in the purchase price of many staple items of construction, maintenance and operation. Again, if a washout or other emergency occurs, a standard bridge, water tank, turntable, etc., etc., can be ordered from the manufacturers in a ten-word telegram, and, pending delivery, a standard foundation can be built in full confidence that the structure will fit. Standard devices, signs and equipment make it possible in emergencies to balance forces and resources by transferring men or material from one property to another with a minimum of inconvenience to the service and to individuals in orienting themselves to strange localities.

STATISTICS.

The co-ordination of so many units in so great a variety

of territory, the maintenance of discipline among an army averaging over 80,000 officers and employees, the conduct of affairs which of necessity overlap jurisdictions of general managers, the duty of reporting conditions and results to the president in New York, all demand the utmost possible legitimate information promptly reaching the responsible head, the director of maintenance and operation. His office is administered upon the theory of a minimum of direct action made possible by a maximum of information, he assisting each one of the units below from the bounteous lessons of experience furnished by all.

Statistics are considered of sufficient importance to warrant a small bureau in the Chicago office under the charge of the assistant to director of maintenance and operation. The same principle is extended downward so that each division superintendent has in his office under his direct supervision a small

UNION PACIFIC RAILROAD COMPANY.

STATEMENT OF LARGE INCREASES AND DECREASES IN AMOUNT OF TRAFFIC, AND IN OPERATING EXPENSES, FOR THE MONTH OF JANUARY, 1909, COMPARED WITH CORRESPONDING MONTH OF THE PREVIOUS YEAR.

ACCOUNT	EXPLANATION (Increases in light type; decreases in heavy).	January, 1909	
		TOTAL	%
	TRAFFIC		
	Freight:		
	Freight Revenue	\$97,346.30	4.58
	Tons one mile (conductors)	71,957,319	28.56
	Gross tons per engine mile	142	13.51
	Average distance hauled—miles	2.63	.84
	Gross tons one mile	66,397,017	9.23
	Freight train mileage	37,668	5.93
	Passenger:		
	Passenger revenue	\$26,095.76	3.68
	Passengers carried one mile	704,614	2.04
	Gross tons one mile	4,326.882	1.54
	Gross tons per engine mile	3	.64
	Passenger train mileage	4,077	.61

MAINTENANCE OF WAY AND STRUCTURES

ACCOUNT	EXPLANATION	TOTAL	%
1-C-Superintendence.	Nebraska Division	155.15	
Miscellaneous Expenses.	Wyoming "	63.82	
Decrease.	Utah "	564.96	
	Kansas "	306.79	
	Colorado "	143.02	
		47.76	
	Total,	899.94	29.64
2. Ballast. Increase, \$1,283.21.	Nebraska Division	\$330.23	
	Wyoming "	237.04	
	Utah "	171.08	
	Kansas "	1,874.80	
	Colorado "	195.40	
	Total,	\$1,283.21	64.45
	* Due to charge of \$1,885.20 account of Leavenworth Western Branch. No similar charge in January, 1908.		

Fig. 1.

force compiling the accounts whose expenditures he in any wise controls. The division accountants are carried on the superintendent's payroll, work under his direction, but are subject to supervision and check by the accounting department, which prescribes methods and forms. The results obtained from these statistical bureaus, and especially from the system of division accounting, have been so gratifying as to warrant extended reference to the forms and methods evolved.

With a view to watching expenses more in detail, the 116 operating accounts of the Interstate Commerce Commission have been increased to 161 for our own purposes. The subdivisions of accounts thus affected are shown in the table on the following page and the resulting advantages are apparent.

Receipts and Expenditures.—Monthly balance sheets showing for each system total receipts and total expenditures are drawn up, show for the period ending with each month of the

CLASSIFICATION OF OPERATING EXPENSES.

SCHEDULE OF PRIMARY ACCOUNTS PROMULGATED BY THE INTERSTATE COMMERCE COMMISSION AND SUB-ACCOUNTS SUPPLEMENTAL IN RESPECT THEREOF.

Primary Accounts.	Sub-Accounts.	Primary Accounts.	Sub-Accounts.
(I)—Maintenance of Way and Structures:		(III)—Traffic Expenses (continued):	
1. Superintendence.	1a. Salaries of officers.	55. Advertising.	
2. Ballast.	1b. Salaries of clerks and attendants.	56. Traffic associations.	
3. Ties.	1c. Miscellaneous expenses.	57. Fast freight lines.	
4. Rails.		58. Industrial and immigration bureaus.	
5. Other track material.	5a. Frogs and switches.	59. Stationery and printing.	59a. Tariffs.
	5b. Rail joints.	60. Other expenses.	59b. Other stationery and ptg.
	5c. Tie plates.		
	5d. Other track material.	(IV)—Transportation Expenses:	
6. Roadway and track.	6a. Applying ballast.	61. Superintendence.	61a. Salaries of officers.
	6b. Applying ties and tie plates.		61b. Salaries of clerks and attendants.
	6c. Applying rails, fastenings, frogs and switches.	62. Despatching trains.	61c. Miscellaneous expenses.
	6d. Maint. and care of track.	63. Station employees.	63a. Agents, clerks and attendants.
	6e. " and care of roadbed.		63b. Labor at stations.
	6f. Extraordinary repairs of roadway and track.	64. Weighing and car-service assns.	
	6g. Removing grass and weeds.	65. Coal and ore docks.	66a. Stations—heating and lighting.
7. Removal of snow, sand and ice.		66. Station supplies and expenses.	66b. Stations—other expenses.
8. Tunnels.		67. Yard masters and their clerks.	
9. Bridges, trestles and culverts.	9a. Bridges.	68. Yard conductors and brakemen.	
	9b. Trestles.	69. Yard switch and signal tenders.	
	9c. Culverts.	70. Yard supplies and expenses.	
10. Over and under grade crossings.		71. Yard enginemen.	
11. Grade crossings, fences, cattle guards and signs.	11a. Grade crossings, cattle guards and signs.	72. Enginehouse expenses—yard.	
	11b. Right of way fences.	73. Fuel for yard locomotives.	
12. Snow and sand fences and snow sheds.		74. Water for yard locomotives.	
13. Signals and interlocking plants.	13a. Signals.	75. Lubricants for yard locomotives.	
	13b. Interlocking plants.	76. Other supplies, yard locomotives.	
14. Telegraph and telephone lines.		77. Op. joint yards and terminals—Dr.	
15. Electric power transmission.		78. Op. joint yards and terminals—Cr.	
16. Buildings, fixtures and grounds.	16a. Roadway buildings.	79. Motormen.	
	16b. Engine houses and shops.	80. Road enginemen.	80a. Road enginemen—passenger.
	16c. Fuel stations.		80b. Road enginemen—freight and mixed.
	16d. Water stations and pipe lines.	81. Enginehouse expenses—road.	
	16e. Station buildings and appurtenances.	82. Fuel for road locomotives.	82a. Fuel for road locomotives—passenger.
	16f. General offices.		82b. Fuel for road locomotives—freight and mixed.
17. Docks and wharves.		83. Water for road locomotives.	
18. Roadway tools and supplies.		84. Lubricants for road locomotives.	
19. Injuries to persons.		85. Other supplies, road locomotives.	
20. Stationery and printing.		86. Operating power plants.	
21. Other expenses.		87. Purchased power.	
22. Maintaining joint tracks, yards and other facilities—Dr.		88. Road trainmen.	88a. Road trainmen—passenger.
23. Maintaining joint tracks, yards and other facilities—Cr.			88b. Road trainmen—freight and mixed.
(II)—Maintenance of Equipment:		89. Train supplies and expenses.	89a. Cleaning cars.
24. Superintendence.	24a. Salaries of officers.		89b. Heating and lighting cars.
	24b. Salaries of clerks and attendants.	90. Interlockers, block and other signals—operation.	89c. Lubricating cars.
	24c. Miscellaneous expenses.	91. Crossing flagmen and gatemen.	89d. Icing and watering cars.
25. Steam locomotives—repairs.		92. Drawbridge operation.	89e. Other train expenses.
26. Steam locomotives—renewals.		93. Clearing wrecks.	
27. Steam locomotives—depreciation.		94. Telegraph and teleph.—operation.	
28. Electric locomotives—repairs.		95. Operating floating equipment.	
29. Electric locomotives—renewals.		96. Express service.	
30. Electric locomotives—depreciation.		97. Stationery and printing.	
31. Passenger-train cars—repairs.		98. Other expenses.	
32. Passenger-train cars—renewals.		99. Loss and damage—freight.	
33. Passenger-train cars—depreciation.		100. Loss and damage—baggage.	
34. Freight-train cars—repairs.		101. Damage to property.	
35. Freight-train cars—renewals.		102. Damage to stock on right of way.	
36. Freight-train cars—depreciation.		103. Injuries to persons.	
37. Elect. equip. of cars—repairs.		104. Operating joint tracks—Dr.	
38. Elect. equip. of cars—renewals.		105. Operating joint tracks—Cr.	
39. Elect. equip. of cars—depreciation.			
40. Floating equipment—repairs.		(V)—General Expenses:	
41. Floating equipment—renewals.		106. Salaries and expenses of general officers.	106a. Sal. of officers—general.
42. Floating equipment—depreciation.			106b. Sal. of officers—treas.
43. Work equipment—repairs.			106c. Sal. of officers—acct'g.
44. Work equipment—renewals.			106d. Other exp. gen. officers.
45. Work equipment—depreciation.		107. Salaries and expenses of clerks and attendants.	107a. Sal. and exp. of clerks and attendants—gen.
46. Shop machinery and tools.			107b. Sal. and exp. of clerks and attendants—treas.
47. Power plant equipment.			107c. Sal. and exp. of clerks and attendants—acct'g.
48. Injuries to persons.			
49. Stationery and printing.			
50. Other expenses.			
51. Maint. joint equip. at trmnls—Dr.			
52. Maint. joint equip. at trmnls—Cr.			
(III)—Traffic Expenses:			
53. Superintendence.	53a. Salaries of officers.	108. General office supplies and expenses.	108a. Gen. offices—rents.
	53b. Salaries of clerks and attendants.	109. Law expenses.	108b. Gen. offices—misc. exp.
	53c. Miscellaneous expenses.	110. Insurance.	
54. Outside agencies.	54a. Outside agencies on line—salaries.	111. Relief department expenses.	
	54b. Outside agencies on line—expenses.	112. Pensions.	
	54c. Outside agencies other cities—salaries.	113. Stationery and printing.	
	54d. Outside agencies other cities—expenses.	114. Other expenses.	
		115. Gen. administration joint tracks, yards and terminals—Dr.	
		116. Gen. administration joint tracks, yards and terminals—Cr.	

fiscal year to date disposition of the revenues of the system under the following general heads: Operating Expenses, Expenses of Outside Operations, Taxes, Hire of Equipment, Additions, Betterments, Construction, Equipment, Remittances, Miscellaneous, Capital Expenditure Carried on Operating Office Books; Current, Deferred and Contingent Assets and Liabilities.

This latter heading shows the balance for each item at the close of the preceding year and at the close of the month to date. This exhibit furnishes in clear, comprehensive form the sources of revenue and the uses to which it has been put up to date, and the June form is the balance sheet for the fiscal year.

Full details of the expenditures, the totals of which appear on this statement, are given on appropriate blanks, operating expenses on the usual monthly statements of earnings and expenses, additions, betterments and construction on special forms.

TRANSPORTATION EXPENSES (Cont'd)

ACCOUNT	EXPLANATION	TOTAL	%
73. Fuel for Yard Loco- motives. Decrease, \$6,255.74.	<i>Nebraska Division.</i>		
	Decreased engine mileage,	\$ 1,503.25	
	Increased consumption per engine mile,	1,555.08	
	Decreased cost per ton,	3,706.44	
	* Due to increase in number of cars handled.		
	<i>Wyoming Division.</i>		
	Increased engine mileage,	251.12	
	Increased consumption per engine mile,	393.14	
	Decreased cost per ton,	889.97	
	<i>Utah Division.</i>		
	Decreased engine mileage,	1,125.32	
	Increased consumption per engine mile,	1,273.13	
	Decreased cost per ton,	941.28	
	* Due to increase in number of cars handled.		
	<i>Kansas Division.</i>		
	Increased engine mileage,	651.94	
	Increased consumption per engine mile,	71.89	
	Decreased cost per ton,	170.00	
	<i>Colorado Division.</i>		
	Decreased engine mileage,	545.26	
	Increased consumption per engine mile,	1,246.75	
	Decreased cost per ton,	2,827.74	
	* Due to increase in number of cars handled,		
	Miscellaneous,	10.47	
	Total,	\$ 6,255.74	20.06
74. Water for Yard Loco- motives. Increase, \$1,789.91.	<i>Mileage.</i>		
	Nebraska Division,	\$ 45.91	
	Wyoming "	29.65	
	Utah "	57.30	
	Kansas "	34.59	
	Colorado "	34.94	
	<i>Cost of Operating of Pumping Stations.</i>		
	Nebraska Division,	367.79	
	Wyoming "	91.19	
	Utah "	840.59	
	Kansas "	28.93	
	Colorado "	786.88	
	Total,	\$ 1,789.91	98.11
	* Due to charge covering proportion of amount paid Omaha Water Co. for water furnished at Omaha and So. Omaha. Similar expenses in Jan.,		

Fig. 2.

Operating Expenses.—The largest deduction from the revenue is, of course, for operating expenses. As soon as possible after the close of each month's accounts the division superintendents forward to the auditor, with explanations, a statement of operating expenses on their respective divisions which they control or partially control. These statements are consolidated by the auditor for the system, and in a few days after the receipt of comparative statement of earnings and operating expenses the director of maintenance and operation receives the explanations in the form, a few sample pages of which are shown herewith (Figs. 1 and 2). From these forms such explanations of fluctuations of expenses as may seem necessary are made to the president.

The division superintendent makes up forms which enable him, within about 15 days after the close of the month, to

know just what the operations entrusted to him have cost segregated as to labor and material, and as to main line and branches, for the current month and for fiscal year up to date compared with the preceding fiscal year.

One of the beneficial results of the panic of 1907, when earnings were rapidly falling and expenses were slow to respond, was to prove the comparative worthlessness of statistics unless they closely follow the operations they record. With the co-operation of the accounting department, methods were devised and instituted whereby the superintendent has at hand at all times the vital information as to the expenses of his

C.S.

Form 2218.

R. R. DIVISION

190—

General Superintendent.

Dear Sir:

I transmit herewith explanations of fluctuations in operating expenses for 190 compared with same period of previous year, having personally reviewed the month's exhibit.

The fluctuations shown in the following accounts are regarded by me as unsatisfactory and I have taken action indicated to improve results in future periods.

ACCOUNT NO.	INCREASE	DECREASE	ACTION TAKEN

Fig. 3.

division, accounts for them within 15 days after the close of the month, and has complete statistics of division traffic and equipment performance within 23 days after the close of each month. Formerly he had to wait 40 to 50 days for this information.

By the 23d of the following month the division superintendent receives back copy of form made up by him with the statistical matter that has been added in the auditor's office. Each division superintendent is, therefore, within approximately three weeks after the close of any month able to know exactly what results have been obtained by him; and these operating sheets forwarded to the general superintendent, general manager and director of maintenance and operation, enable each one of these officers to intelligently pass upon the results obtained by their subordinates.

C.S.

Form 2219.

R. R. DIVISION

190—

Director Maint. & Oper. or General Manager

Dear Sir:

I transmit herewith Superintendents' explanations of fluctuations in operating expenses on lines under my jurisdiction for 190 compared with same period of previous year, with their letters indicating action taken. I have personally reviewed the month's operations as reflected by these exhibits which are unsatisfactory to me in the following respects, as to which I have taken action indicated to improve results supplemental to that of Superintendents.

ACCOUNT NO.	INCREASE	DECREASE	ACTION TAKEN

Fig. 4.

The superintendent is required to analyze and explain operations shown on Forms 4,913 and 4,914 on Form 2,218 (Fig. 3), showing the general superintendent what action he has taken to improve unsatisfactory results. A similar Form, 2,219 (Fig. 4), is required of the general superintendents by the general managers, and of the general managers by the director of maintenance and operation when transmitting the division explanations of expenses. This requires officers to closely study operating results and insure the application of necessary corrections. It has also largely reduced letters and telegrams of inquiry and explanation.

To further analyze operating expenses and results, the Chicago office avails itself of copies of statistical forms and reports made for the use of the officers in active charge of opera-

first hand information, are robbed of excuses for failure to keep within their respective periodic labor and material allowances for maintenance expenditures.

Maintenance of Equipment.—A close watch is kept on the condition of freight equipment, and reports of number of bad order cars made every 10 days (Fig. 5), and of condition of locomotives every month (Fig. 6). Copy of consolidation of these division statements, made in the general managers' offices at the close of the month, is sent to the director of maintenance and operation.

CARS UNDERGOING AND AWAITING REPAIRS
March 1st, 1909

	March 1st, 1909				Feb. 1, 1909		Mar. 1, 1908		Bad Order Cars per Mi. of Rd. Mar. 1, 1909	
	System & Home	Pct. of Total Equip.	Foreign	Total	Total	Pct. +Inc. -Dec.	Total	Pct. +Inc. -Dec.		
Union Pacific Railroad.....	504	3.9	82	676	4.5	787	-14%	855	-21%	.20
Oregon Short Line R. R.....	408	5.5	66	474	6.4	496	-5%	702	-32%	.19
Oregon R. R. & Nav. Co.....	78	2.5	9	80	2.8	94	-8%	110	-35%	.05
Sou. Pac. Co.—Pacific Sys.	1,912	7.1	136	2,048*	7.6	1,215	+60%	1,374	+49%	.48
Louisiana Lines.....	716	4.2	42	758	4.4	905	-16%	1,558	-31%	.23
Total.....	3,708	5.3	334	4,042	5.8	3,497	+15%	4,679	-14%	.26

* Increase due to reduction working hours in shops.

Fig. 5.

tions on each system. For maintenance of way officers, Statistical Form 231 shows in 48 columns the average mileage operated, cost per mile of main and additional main track for year up to date, and for various items, followed by statistics showing the number of ties and tie plates used up to date, and the percentage of those used to the allotment for the year; the physical characteristics of track as to weight of rail, ballast, tie-plating, density of locomotive mileage, and, finally, a comparison of principal items with corresponding ones of previous year. General and division officials, with this

CONDITION OF LOCOMOTIVES

JANUARY 1st, 1909

Road	Good Order			NEEDING REPAIRS		IN SHOP		Spare
	Number	Per cent.		Number	Per cent.	Number	Per cent.	
		1908	1907					
Union Pacific R. road....	400	74%	67%	92	14%	78	12%	53
Oregon Short Line R. R....	335	80%	79%	53	13%	31	7%	63
Oregon Railroad & N. Co....	201	77%	74%	44	17%	14	6%	29
Sou. Pac. Co.—Pacific Sys.	703	70%	70%	178	17%	131	13%	45
Louisiana Lines.....	582	73%	80%	73	14%	70	13%	32
Total.....	2,111	74%	73%	438	15%	324	11%	215
Locomotives Owned January 1st	2,873					Spare	215	
Dec. 1st	2,880						180	
Nov. 1st	2,884						189	
Oct. 1st	2,891						210	
Sept. 1st	2,896						245	
Aug. 1st	2,904						359	
July 1st	2,917						343	

Fig. 6.

Form 512-A (Fig. 7), one of the few forms compiled by the general auditor especially for the Chicago office, copies of which, however, are sent to all interested, gives a check of cost of handling freight at important stations, one of the largest items of operating expense.

Passenger and freight train statistics are shown on Forms 622 (Fig. 8) and 544. The only cost items given are those controllable by the superintendent. Weekly and monthly tonnage statement, which we think our most useful and important form, not only for the Chicago office

FORM 512-A.

OREGON SHORT LINE R. R. CO.

THE OREGON R. R. & NAVIGATION

OPERATIONS OF IMPORTANT FREIGHT STATIONS FOR THE MONTH OF OCTOBER, 1908 AND 1907.

M									ITEM								
	KANSAS CITY		SALT LAKE		SPOKANE		PORTLAND			OGDEN		RENO		SACRAMENTO		OAKLAND	
	1908	1907	1908	1907	1908	1907	1908	1907		1908	1907	1908	1907	1908	1907	1908	
1,232	1,287	1,094	1,063	276	292	801	887	1	Number of freight cars originating at station, loaded by stationmen	1	1,302	1,598	187	103	1,537	1,650	4,537
23,911	26,696	16,808	21,898	2,825	3,430	15,790	17,041	2	Number of freight cars handled in station yard	2	44,438	56,041	3,567	4,329	47,714	30,571	60,913
9,598	11,739	8,533	8,972	1,661	2,102	9,737	10,743	3	Tons of freight loaded by stationmen into cars originating at station	3	16,841	26,038	1,999	1,552	13,838	14,739	56,881
								4	Tons of freight loaded by stationmen into cars passing station	4			137	168			33
4,731	6,963	6,720	7,566	1,069	1,340	9,408	14,625	5	Tons of freight unloaded by stationmen	5	17,440	26,600	2,232	1,889	9,141	11,529	47,487
10,473	12,689	12,473	13,510	2,343	3,007	19,145	25,368	6	Total tons of freight handled by stationmen	6	23,476	33,659	4,138	3,325	16,873	20,980	78,514
93,705	99,343	69,209	78,534	13,943	16,343	185,871	200,376	7	Total tons of freight handled by stationmen, shippers, etc.	7	57,943	61,154	29,612	26,749	105,012	133,099	213,150
7.8	9.1	7.8	8.4	6.0	7.2	12.2	12.1	8	Average tons of freight loaded per car by stationmen into cars originating at station ...	8	12.9	16.3	10.7	9.4	9.0	8.9	12.5
4,347	4,505	3,052	3,554	1,676	2,383	5,068	6,797	9	AGENCY EXPENSES FOR FREIGHT SERVICE. Agents and clerks	9	3,167	3,150	2,071	2,246	5,394	9,154	8,146
3,504	4,021	3,250	4,270	1,050	1,398	7,800	12,544	10	Station Labor	10	4,762	8,711	848	2,469	5,717	6,977	14,606
7,851	8,526	6,302	7,824	2,726	3,781	12,868	19,341	11	Total	11	7,929	11,861	2,919	4,715	11,111	16,131	22,752
4,842	6,579	4,827	8,393	774	1,132	3,895	4,633	12	Expenses Yardmen and Switchmen in Freight Service (dollars)	12	5,968	10,267	745	1,425	6,654	11,542	11,947
12,693	15,105	11,129	16,217	3,500	4,913	16,766	23,974	13	Total Agency and Yard Expenses for Freight Service (dollars)	13	13,897	22,128	3,664	6,140	17,765	27,673	34,690
0.20	0.25	0.29	0.38	0.27	0.33	0.25	0.27	14	Yard Expenses per freight car handled (dollars)	14	0.13	0.18	0.21	0.33	0.24	0.38	0.20
41.5	35.5	24.5	26.3	71.5	79.2	26.5	26.8	15	Cost of Agents and clerks per ton handled by stationmen (cents)	15	13.4	9.3	50.0	67.5	31.9	43.6	10.4
33.5	31.7	26.1	31.6	44.8	46.5	40.7	49.4	16	Cost of station labor per ton handled by stationmen (cents)	16	20.2	25.9	20.5	74.2	33.9	33.2	18.6
18,389	26,539	13,574	23,529	5,079	7,512	16,752	20,849	17	Miles run by switch locomotives	17	18,750	34,208	3,060	6,678	22,359	35,156	52,326
NUMBER OF CARS INTERCHANGED WITH CONNECTIONS																	
6,241	7,288	1,986	2,089	1,278	1,635	2,809	2,923	18	Received from	18	5,952	6,923	275	318			
5,945	6,611	2,466	3,052	1,311	1,452	2,780	3,154	19	Delivered to	19	6,313	9,169	265	357			
12,186	13,899	4,452	5,141	2,589	3,087	5,589	6,077	20	Total	20	12,265	16,092	540	675			

Fig. 7.

but for every superintendent and division officer, shows in great detail the tonnage moved by the locomotives both east and west bound, so that the effect of preponderance of traffic on train load may be watched. As it appears seven to eight days after the train movements it records, transportation officers have early means to check the most efficient use of power—the foundation of economical management. It deprives the subordinate of the usual excuse that traffic preponderating in one direction prevented efficient train loading, by showing what was done in that direction as well as in that of lesser traffic. Form 1,245, a companion sheet, shows efficiency of use made of motive power. In third column, under heading "Potential Ton-Miles," it shows how many ton-miles could have been actually given the locomotive on the run in question. This compared with the actual ton-miles moved, gives at once a check on the power wasted. The money value of this wasted power is computed for each division by the auditor and is shown as the last item in the statistics on Form 4,914.

To stimulate most efficient use of car capacity, Forms 1,290 are issued as promptly after the first of the month as possible. They are usually in the hands of the superintendents in from 15 to 18 days after close of month, and show exactly how cars have been loaded with principal commodities.

Form 164 shows statement of expenses incurred in maintenance and operation of interlocking plants, and Form 165 the expenditures incurred on account of maintenance of automatic block signaling. These two forms have recently been devised on account of the very large mileage of automatic signals and increasing number of interlocking plants.

Accidents in train service and casualties resulting therefrom are consolidated by each general manager on Form 2,800, and transmitted to Chicago with computations showing number of accidents and property damage per million locomotive-miles run. For comparative and competitive purposes, these reports are consolidated in the office of the director of maintenance and operation and issued monthly, so that each general manager may know exactly what his associates are doing. A detailed monthly statement of serious train accidents comes to the Chicago office and its lessons are disseminated to the several operating units.

The operations of the rolling mills at Laramie, Wyoming, and Sacramento, California, in which scrap is reworked, are shown in detail on Form 2,341. The operation of the brass, iron and wheel foundries is shown in detail on Forms E-21, 2,462 and 2,305.

Earnings and expenses of dining-car and hotel service are shown on Form 160.

For ready reference by the director of maintenance and operation and his staff, the principal operating statistics for each property are shown in graphical condensed form in a pocket memorandum book about 4 x 6 in. Pasted in this book is a folded condensed statement showing certain important operating statistics for expired months of current and corresponding period of previous fiscal year with percentage of increase or decrease. This small sheet gives a comprehensive view of the operation of all the properties up to date. It is very useful and convenient.

In addition to these forms, which are regularly rendered, it is customary to select some one item of expense from time to time and make it the subject of special study, this stimulating attention and thought on this particular item, further study being given when deemed necessary.

The small table on the following page gives some idea of the results of the system in the face of a steady rise in the prices of labor and material.

Had the 1909 business been moved at the 1904 train loading rate, about 10,000,000 more freight train miles would be required for the year than will actually be the case. For the period shown, 34 per cent. more passengers and 24 per cent. more tons of freight were moved one mile with only 10 per

STANDARD.

17

FORM 822 STATISTICS OF FREIGHT TRAIN SERVICE, FOR THE MONTH OF OCTOBER, 1908.

UNION PACIFIC RAILROAD COMPANY.

DIVISION		COST PER LOCOMOTIVE MILE (Ct.)										COST PER FREIGHT TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER TON MILE (Ct.)										COST PER T									
----------	--	--------------------------------	--	--	--	--	--	--	--	--	--	---------------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	-------------------------	--	--	--	--	--	--	--	--	--	------------	--	--	--	--	--	--	--	--	--

Fig. 8.

cent. more train miles. The efficiency based upon traffic handled per employee also increased.

All expenditures for additions and betterments require an "Authority for Expenditure," approved by the Chicago office and passed upon by the executive committee of the board of directors in New York. These authorities, involving necessarily an immense amount of detail, add largely to the volume of important business of the Chicago office. Their tabulation

	Total, All Associated Lines.		
	6 months end'g Dec., 1908.	Year ending June, 1908.	Year ending June, 1904.
Passengers one mile, excluding ferry passengers	1,175,960,857	2,212,680,362	1,604,272,671
Passenger train miles	16,430,395	33,022,772	26,805,518
Passengers per train	71.7	67.0	59.8
Ton miles freight, including company freight	7,253,756,237	14,127,148,337	11,396,231,734
Freight train miles	14,496,698	31,691,620	30,822,000
Tons, freight per train	500.26	445.65	370.01
Loaded car miles	339,833,050	644,695,870	579,389,550
Tons per loaded car	21.34	21.90	19.68
Total operating expenses, rail lines	\$52,383,070	\$116,183,010	\$86,243,263
Per cent. operating expenses to earnings	52.49	61.79	61.17
Total train miles	29,537,367	61,679,427	56,147,089
Operating expenses per train mile	\$1.78	\$1.88	\$1.54
Operating expenses per ton mile (mills)	3.5	4.2	4.2
Number of employees at close of period	80,006	72,765	75,258

each month, showing amounts authorized, spent and unexpended, enables the board to properly finance operations. All authorities expire with the fiscal year, and if the work is not completed the unfinished part must be covered by a new authority.

REPORTS.

Crops.—A weekly report of crop conditions in contiguous territory is made by the Chicago office on Form 2,616 for the information of the president and the board of directors. The railway administrative machinery is employed without the aid of specialists. The primary data, showing conditions and prospects, originate with the station agents after consultation with the farmers and other local persons. These station reports are consolidated and edited first in the offices of the division superintendents and for the divisions in the offices of the general managers. After final consolidating and editing in the Chicago office, the weekly report of perhaps 2,000 to 3,000 words is ready for New York. Each report is made complete in itself. A weekly and much briefer telegraphic report is made showing traffic possibilities as reflected by the condition of staple crops. In preparing these crop reports, the general methods of the United States Department of Agriculture are followed. Based upon local information, supplemented by all available government and state statistics, an estimate is made of the acreage, condition and probable yield, compared with a "normal" which is usually the average of the preceding five years.

Press.—Each general manager receives current issues of practically all newspapers and periodicals published in his territory. A competent person in his office, after careful scrutiny of editorial and other matters, tabulates and compiles a record showing the general attitude toward railways and other corporations of each publication. Twice a month each general manager telegraphs the director of maintenance and operation a brief fortnightly synopsis of public sentiment as reflected in the press, showing number of publications examined, percentage favorable, neutral and antagonistic, quoting criticisms, complaints and expressions of special interest, and commenting upon the general trend of opinion as voiced from political and commercial centers. The Chicago office briefs and consolidates these reports for telegraphic transmission to New York. These reports are of great benefit in detecting causes of friction and enabling the application of prompt corrective measures.

The regular reports are supplemented by special telegrams covering items or incidents of more than usual importance or

significance. In addition, numerous newspaper clippings are currently forwarded by mail through the Chicago office.

The equipment of the associated lines is pooled, and to get the maximum use of the equipment some directing office must have arbitrary authority to order movement of equipment from one point to another in emergency and to adjust balances at system interchange points. Form 1,335 was devised for the purpose of showing the general manager and his important assistant, the car service agent, from the morning report the location of entire equipment on each system. Data for each division are transmitted by wire each morning on the usual 7 a.m. report. The results are compiled daily for the use of the car service agent and general manager and copy of compilation for the 10th, 20th and 30th of the month are forwarded to the director of maintenance and operation. The footings show him at a glance the condition of car balances at interchange points between lines over which his jurisdiction extends, indicating how many foreign cars are on associated line roads, how many associated line cars are on foreign roads, and locate generally to within 1 or 2 per cent. the entire associated line equipment of some 75,000 freight cars.

The assistant director of maintenance and operation, among other duties, handles these larger movements of equipment. It will be observed that no detailed car record is kept in the Chicago office. To do so would destroy the policy of local autonomy; the director of maintenance and operation would become general manager of some 18,000 miles of railways—an impossible task for any one individual.

The Harriman freight car pool is not unlike those of the Pennsylvania and of the New York Central. When the principle is extended to the pooling of car pools, the car efficiency and traffic capacity of American railways will be appreciably increased. The same methods that brought about a reduction of 54,000,000 miles movement of empty cars on the Harriman lines in the two years after their inauguration would make a proportionate reduction of 477,000,000 annually on the railways of the United States. Anything that tends to strengthen the service of a railway redounds to the reciprocal advantage of the public it serves. The patrons of the Harriman lines are better off because the same refrigerator car which moves melons from the Mexican border to the Atlantic seaboard in June can handle Oregon peaches in August, Colorado potatoes in October and California oranges in December, besides hauling merchandise west on each return trip. So it is the country over. Combination into large units is demanded by the bigness of modern conditions. It is the duty of the railways to help educate the people in right thinking and to avoid suspicion of unwillingness to disclose actual conditions.

PUBLICITY.

The policy of the Harriman lines is to be frank with the public in company matters. When a serious accident occurs, an open board of inquiry is promptly convened by the division superintendent, consisting of himself, the master mechanic, the division engineer and two or more prominent representative citizens. This board, a high class jury, hears evidence and publishes its findings in the local press. Not infrequently a newspaper man is a member of the board. If this board does not get to bottom facts, a second is convened, composed of general officials and of prominent citizens of the state; for example, an ex-governor, a well-known banker, a leading editor, a retired general officer of the army, etc., etc. This policy has greatly improved discipline and educated public sentiment. The men are eager to avoid the published censure of their fellow citizens. The public are pleased with the frankness of the companies and sympathize with their difficulties. Personal injury settlements are no heavier—if anything, are lighter—under this policy. It is idle to argue that liability can be avoided by a suppression of information.

INSPECTION.

The adoption of standards implies seeing that they are maintained. Each general manager and the members of his

staff may in the utmost good faith report that a standard practice or device has been installed. Investigation may disclose the fact that due to honest differences in interpretation two adjacent properties have in reality widely varying practices. Such non-standard conditions can only be ascertained and corrected by open and above board inspection from the Chicago office.

The director of maintenance and operation and the members of his personal staff spend much of their time on the road, seldom traveling together, and seldom all being in Chicago at once. They cannot, however, do all of the inspecting necessary for proper co-ordination. To avoid dwarfing the general managers by building up a large permanent staff in Chicago, the condition is met by detailing for temporary special duty as inspectors or special representatives various officials of the associated lines. This serves a double purpose. It secures not only proper information of actual conditions for the Chicago office, but it broadens the individual selected. He returns to his own property with the viewpoint of the Chicago office, some knowledge of the other properties and a better appreciation of the problems of correlation. During his absence, an understudy in his own position has been tried out for future advancement. The effort is to develop all-around men. For example, a general superintendent was detailed to act as chairman of a committee which traveled over the associated lines and other railways to recommend the best practices in handling brakes on heavy grades. In addition to a valuable report on this subject he also, among other things, made useful recommendations as to standardization of trainmen's uniforms.

The effort is to use intelligent, high class inspection as a means of disseminating education to officials. The financial depression of 1907 caused drastic reductions in maintenance expenses. To make certain that the point of safety was not passed, and to assist in meeting the exceptional state of affairs, a maintenance of way inspector traveled over the lines for several months conferring freely with local officials. When it became manifest that the desired result had been reached, this inspection work was discontinued. Frequently, a prescribed report can be made to answer certain purposes of inspection without sending out an inspector. When the effect has been produced, when the lesson has been learned, the report is withdrawn. Examples of current reports to the Chicago office which have been discontinued are, cast iron wheels removed per 100,000 car-miles run; hot boxes per 100,000 car-miles run; engine failures; comparative cost of repairs as between steel and wooden cars.

The inspectors and special representatives are forbidden to exercise authority. They can observe, inquire, investigate, confer, advise, suggest and report, but must not order or interfere with local administration.

EDUCATION.

A prime function of the Chicago office, by virtue of its broader viewpoint, is to act as a bureau of education. Most of the effect is produced by analyzing and comparing statistics and reports, communicating conclusions by correspondence or by personal interviews on the ground. This work is supplemented by one or more special representatives, chief among whom is the consulting engineer, a permanent member of the Chicago staff. The consulting engineer, among his many advisory activities, takes young civil engineers from the lines for service in his office, and with this supplementary training returns them to their properties better qualified for official positions. A student course of practical training for division officials and sub-officials is being worked out on the various properties.

The other representatives are detailed from time to time, being selected for their experience and tact, and sometimes to develop and try out some meritorious idea originating with the man himself.

As a further means of education, division officials are sent—

a few at a time and usually in a business car—on a 15-day trip once a year over other railways to observe methods and appliances.

The semi-annual meetings of general officials are held in different cities on the associated lines in order that the participants may gain an idea of conditions on all parts of the system.

The Chicago office endeavors to spread among all the properties or to cause them to send to each other from every available source all possible information that may have an educational value.

Every consistent effort is made to impress upon all concerned the necessity for carrying out both the spirit and the letter of requirements—to avoid the perfunctory performance of duty. An officer is expected to take the same personal interest in crop reports, in traffic possibilities and in press bulletins that he does in the movement of his trains or his unit costs of production and performance.

CONCLUSION.

Countless details of daily routine have been purposely omitted from this summary. To the professional they are superfluous. To the layman they are unnecessary. An effort has been made to show the general practical methods of obtaining those satisfactory results which first existed as a bold conception in the brain of one man, E. H. Harriman.

RAILWAY RATE MAKING IN PRACTICE.

BY WILLIAM Z. RIPLEY,
Professor of Economics, Harvard University.

CHAPTER III.

THE INTRICACIES OF FREIGHT RATE ADJUSTMENT.

The intricacy of freight rate adjustment in response to the subtleties of commercial competition depends only in small measure upon the absolute freight rate imposed. The main problem is that of relativity of rates. But this does not mean mere relativity of rates as between competing commodities or places. A strict relativity based upon commercial conditions must often obtain as well between the rates on raw materials and their own finished products; between all the various by-products in an industry; and, of course, always as between goods capable of substitution one for another. A few illustrations will serve to make these details clear.

The matter of properly correlating the freight rate on raw materials and the finished products made from them is more far-reaching than it seems. The location and development of manufacturing depends upon it. The country may be broadly divided into agricultural and manufacturing sections. The first of these is ambitious to develop its resources; not only to feed, but to clothe itself and make other provision for its needs. No sooner does it seek to develop local manufacturing than it finds itself exposed to competition from the older established manufacturers at a distance. Sometimes, even, these remote manufacturers draw their supplies of raw material from its own fields and forests. These supplies are then shipped long distances as raw material; manufactured and thereafter returned to sell in competition with the local product. The local market in relatively undeveloped areas is probably insufficient to provide support for manufactures on a profitable scale. It is essential to dispose of the surplus product over a wider area. Thus there arise two classes of manufacturers: one "next the stump," manufacturing at the source of the raw material and desiring to ship the finished product; the other, remote perhaps from supplies of raw material, but favored by long experience, by abundant supplies of capital and of skilled labor and by other advantages.* Neither class of producers can prosper without overflowing into the

*Vide chapter on Localization of Industry in the Federal Census of Manufacturers, I, pp. cxc-cxiv.

domain of the other. The outcome of this competition depends in part upon the policy of the carriers. If the rate on the raw material be relatively low, the remote manufacturer is aided. Cotton mills and shoe factories in New England prosper in competition with establishments in the South or the Middle West. If on the other hand the rate on raw materials be inordinately high while at the same time low on outward-bound shipment of manufactures from the seat of the raw materials, the tendency is in favor of the upbuilding of manufactures, not near the historic centres of population and consumption, but near the sources of natural wealth, which are the potential homes of manufacturing.

The long-standing controversy over relative rates on wheat and flour for export affords an interesting illustration of the difficulties of properly correlating charges of this sort.* Originally the rates on wheat and flour—the raw material and the manufactured product—were the same. In 1890 the railways leading to the Gulf ports began to discriminate by giving lower rates on wheat, but the Trunk lines until 1899 held to the original equality between the two. Finally, however, the struggle between the Trunk lines and the Gulf roads for business forced the former to lower their rates on wheat, leaving the flour rates, not subject to Gulf competition, undisturbed. At times the rate on wheat for export was as much as 9 cents per hundred pounds lower than the rate on flour. Thus the rate on wheat for export from the Mississippi river to the seaboard was frequently 12 cents, while the rate on wheat from the same points to Chicago added to the rate on flour there manufactured and sent on in barrels or bags to New York was 22 cents—a clear discrimination against the domestic manufacturer in this instance of 10 cents per hundred pounds. For his American-made flour sent abroad in competition with flour made in Liverpool from American wheat would evidently cost that much more at delivery. In other words, wheat could be transported to England and there ground much cheaper than it could be ground here and then shipped. This bore with particular severity upon small millers, partly because their costs of manufacture are relatively high, and also because any limitation of export business forced the large millers to bid more keenly for local domestic trade. Inasmuch as a fair margin of profit to the American manufacturer would not exceed 2 cents per hundredweight, it is apparent that this discrimination operated severely against the American miller. Minneapolis fortunately was unaffected by this discrimination, much of its exports going out by Canadian lines to the Lakes. The carriers defended this difference in rates on the ground of water competition by the Lakes or combined rail and water routes which were alone open to wheat, and which thereby unduly lowered the rate on that commodity; and also on the basis of the lower cost of service in moving the raw material as compared with the finished product. It is apparent that issue was really raised in such a case between the interests of the farmer and of the manufacturer. The United States, producing a surplus of wheat the price of which is made on the Liverpool market in competition with the world, is compelled to find an outlet for this product. It is obvious that any reduction of the freight rate—the prices in Liverpool remaining fixed—would inure to the benefit of the farmer, who would thereby receive a higher price for his product. Viewed in this way the railways by discriminating in favor of the rate on wheat were helping the farmers. But at the same time by moving this wheat more cheaply than flour the railways were encouraging the location of flour milling abroad and rendering it impossible to manufacture flour for export at a profit in the cities of the Middle West. In these export cases it does not appear clearly why the rate on flour for export might not have been reduced somewhat. The Interstate Commerce Commission finally rendered a decision to the effect that the existing difference in rates constituted an

undue preference in favor of the foreign manufacturer, adding at the same time that these discriminations seemed to be due primarily not to a desire of the railways to aid the American farmer in disposing of this surplus wheat, but to the bitterness of competition between the Gulf and Trunk Line railways. They decided that any discrimination greater than 2 cents per hundred pounds in favor of wheat for export as against flour was unreasonable. This difference was permitted, however, on account of the greater cost of handling the manufactured product. It is significant of the then state of the law that the railways paid no attention to this order, and although conditions improved somewhat, there is still great complaint.

The relative rates on wheat and flour, even when for domestic consumption, illustrate the same difficulty of commercial competition—the necessity of adjusting the rate on raw materials to that on the finished product.* The rate on wheat from Wichita, Kan., for example, to California is 55 cents per hundred pounds, while the rate on flour between the same points is 65 cents. Is this difference in rates economically justifiable? California wheat is soft, so that flour produced from it is much improved by the admixture of hard wheat, such as may be obtained in Kansas. California, formerly a large wheat exporting state, has of late years relied to a considerable degree upon the Middle West for part of its supplies. Kansas flour sells for 75 cents a barrel more than California wheat flour. Shall this Kansas wheat to be consumed in California be ground in Wichita or in California? Here is material for controversy, not between one particular railway and another, but in reality between the millers in Kansas and the millers in California. It is quite analogous to the issue raised over export wheat and flour between the miller in Chicago and his rival in Liverpool. In this instance, if milled in Kansas, the railways enjoy the carriage of flour; while if ground in California the railways carry the commodity in the form of wheat. Owing to certain practical conditions, such as the percentage of waste and relative differences in labor costs, the Kansas miller appears to enjoy a certain advantage over his far western competitors. At this point the interest of particular railway companies appears. The Rock Island, if the milling industry in Kansas develops, obtains the haul not only of the flour, but also of the fuel and of supplies for the communities engaged in the business. On the other hand the Southern Pacific is more largely interested in the local development of manufactures in California. The Rock Island, by maintaining a higher rate on flour than on wheat, would tend to hold its clients in the field. The Southern Pacific, on the other hand, by securing the reduced rate on the wheat from Kansas would materially advance the welfare of its constituents. Thus the rivalries of the competing localities immediately become the direct and immediate concern of rival railways.

Cases precisely analogous in principle to those concerning the relativity of rates on grain and grain products have troubled the carriers for years in respect to the rates upon cattle and packing house products. A low rate on cattle as compared with beef favors Chicago to-day as against Missouri river points, the latter being nearer the cattle ranges; just as a generation ago it enabled cattle to be brought to New York and Boston to be there slaughtered and sold on the spot. The history of this controversy throws much light upon the difficulties of rate-making in practice. Originally the railways encouraged cattle raising by a rate which was only about one-third of the rate charged for beef. Slaughtering was carried on in the East adjacent to the great markets. To this policy the Western packers objected strenuously. They demanded a relatively low rate on their finished product in order to enable them to bid against the local eastern slaughter houses. The stockmen, on the other hand, naturally desired a continuance of the low rate on cattle, as it perpetuated com-

*The leading case is reprinted in Ripley, *Railway Problems*, pp. 441-475.

*Interstate Commerce Reports, No. 917, decided June 24, 1907.

petition between eastern and western buyers. The controversy between the stock raisers and the packers was thus shifted onto the shoulders of the traffic managers of the railways. The dispute culminated in 1883 when the Trunk Line Association appointed a special committee to consider what the proper adjustment should be. This committee in turn referred the matter to Commissioner Albert Fink, "Seeking a relativity of rates so as to make the charges for transportation, including the expenses incident to the transportation of dressed beef, the same per pound as the charges per pound of dressed beef transported to the East in the shape of live stock." A difficult task this, considering the variety of by-products emerging into value year by year. Cattle rates had been for some time 52 per cent., and then later 60 per cent. of the dressed beef rates. This was relatively higher for cattle than had been charged during the seventies. But the packers demanded that the relativity in favor of the finished product be still further advanced until cattle rates should equal 75 per cent. of the rates on beef. This would effectually discourage the shipment of cattle to eastern centers, and would tend to upbuild Kansas City and Chicago at their expense. In 1884, the matter being still in dispute, was referred to Hon. T. M. Cooley, afterward chairman of the Interstate Commerce Commission. He decided that a fair compromise would be 40 cents on cattle from Chicago to New York with coincident rates of 70 cents on beef. This would make the cattle rate about 57 per cent. of the beef rate. It was a victory for the stockmen as against the Western packers, who raised a great outcry.

It would have been difficult to predict the final outcome had not an entirely new factor appeared which transformed the conduct of the beef packing industry. Specially constructed stock cars owned by private companies began to be built. These favored the perpetuation of competition between eastern and western packers. To checkmate this the western packers had already embarked in 1879 upon the ownership of privately owned refrigerator cars for the carriage of their finished products. The custom was adopted by the railways of paying for the use of these cars by making an allowance of so much a mile as a deduction from the established tariffs. This at once opened the way to secret rebates of all sorts. The refrigerator traffic in these private cars was large in volume, very regular and highly concentrated as to source. A large tonnage could be diverted at any time to that road which could best show its appreciation of the favor. The Grank Trunk, for instance, in 1887 swept the board, monopolizing this entire business for a brief time, obtaining it by secret and discriminating rates. The railways jointly sought to free themselves from the domination of the large packers; but the phenomenal growth of their business, both domestic and export, rendered them too powerful to resist. According to expert data, during nine months to May 1, 1889, three shippers alone received from one line of road \$72,945 for the use of their cars. This about equalled the initial cost of eighty new cars. For the year ended 1895, \$8,744,000 was paid by the railways of the United States for the use of these cars—about \$4,000,000 of this being in the form of rental. At this rate profits of from 25 to 50 per cent. upon the investment accrued to the great packers. These virtual rebates of course drove all competitors from the field. The story of the gradual extension of this system of private cars to include fruit and produce business belongs in another place. Suffice it to say that the bondage was broken only by the passage of the Hepburn Act of 1906. The growth of these private refrigerator car lines caused the disappearance of live stock shipments. Packing and slaughtering on a large scale at the seaboard, either for domestic consumption or export, was doomed. Meantime, however, the controversy over the relative rates on beef and cattle continued just as if anything really depended upon it. The issue was again submitted to the commissioner of the Trunk Line Association in 1887. In the following year a

select committee of the United States Senate was appointed at the urgent request of the cattle raisers. Testimony before this committee showed in detail how eastern packers were striving to build up establishments near the points of consumption, but were driven out of the business by the relatively high costs of shipping cattle as compared with the rates at which dressed beef could be actually delivered from Chicago and Missouri river points. This entire history, aside from its significance as a study of personal discrimination, illustrates the effect of a relatively increasing differential rate, partly open and partly secret, against the raw material of an industry as compared with the finished product. The result at all events has been to concentrate the packing industry in the Middle West. Nor is the controversy closed even yet. But this time it is a question, not between the seaboard and Chicago, but between Chicago and the Missouri river points. Always and everywhere the manufacturer seeks to develop at or near the source of the raw material. Whenever this tendency does not appear in an industry it is pertinent to inquire how far the relative adjustment of rates is responsible for the phenomenon.

Complexities in rate adjustment often arise from the fact that in the manufacture of many commodities the marketing of by-products is of increasing importance. The rate on the whole series of related commodities must be taken into account at once. Thus in lumbering a large amount of waste or very low-grade lumber is necessarily produced. This common lumber cannot bear long transportation; it must be utilized locally, if at all. On the other hand the choicest specialties will command a price even in remote markets. A monopoly price is enjoyed in such a case. The Pacific coast lumbermen can market their long timbers anywhere in the United States; but the demand for the common lumber, restricted to a sparsely populated region, tends to be exceeded by the supply. The real competition between the Southern, the Michigan, the Wisconsin, and the Pacific coast manufacturers thus narrows down to the sale of the medium grade product. And the cost of production of this is, of course, in part dependent upon the profit made upon the other two sorts, each of which, in its own field, appears to be a monopoly. A wide market and a good price for medium-grade lumber may so lessen the cost of the cheapest by-products that they in turn may be so reduced in price as to widen their reach to the consumer. Each rate reacts upon the others. The situation can be successfully controlled only by adjusting them all at once.

Not only are rates competitive as between raw materials and the finished product made from them, but the circle of competition immediately widens to include all commodities capable of substitution one for another. Coal rates, of course, are partly determined by rates on cordwood, and vice versa. During the great coal strike in Pennsylvania in 1903 soft coal rates and hard coal rates were sadly disturbed. Such substitutions are always likely to occur. But the conditions are not always so simple as this. An instance in point is given by a witness before the Senate Committee on Interstate Commerce in 1905.* This shows how a reduction in the rate for transportation of corn from Kansas to Texas brought about a corresponding reduction in the rate on flour from Minneapolis to Chicago. There was a large crop of corn in Kansas; and the Chicago lines anticipated brisk business in the carriage of this product. The traffic managers of lines from Kansas to Texas, however, discovered a large demand for corn in Texas at a price higher than then prevailed in Kansas. Any rate less than the difference in prices between the two districts would cause shipments of corn to flow from Kansas to Texas, just as inevitably as water flows down hill. This rate would needs be low; but the corn could be loaded on empty south-bound cars which had been used to haul cotton out of Texas to the north. This, of course, entailed a diversion of corn from the Chicago railways, which promptly reduced their

*Testimony, volume II, pp. 1676.

rates in order to hold their traffic. For years the rates upon wheat and corn had been fixed in a definite relation to one another, based upon commercial experience. Any reduction of the corn rate compelled a reduction of the wheat rate. A fall in the wheat rate brought about a drop in the rate on flour. These reductions in corn started in southern Kansas; but parallel lines in northern Kansas were compelled to follow suit. Grain in the territory between the two roads could be hauled by wagon either north or south corresponding to a fraction of a cent per bushel difference in the price. Thus the reduction in rates spread from one line to another all over Kansas, throughout Nebraska up into Dakota and finally to Minnesota. It not only affected the corn rate everywhere, but it caused a reduction in the rate on flour from Minneapolis to Chicago.

The reliance of Texas for a portion of its corn supply upon the surplus product of Kansas sometimes leads to odd results. This commodity is sometimes shipped as corn meal and sometimes transported as corn to be afterward ground in Texas. The Texas millers at one time demanded a relative reduction of the rate on grain as compared with corn meal, and the railway commission of that state upheld them in that demand. For 10 years down to 1905 the differential in favor of the raw product had been 3 cents a hundred pounds. Then the railways, in connection with a general advance of rates, increased the charge on corn meal until it amounted to about 9 cents per hundred pounds more than the rate on corn. One cent a hundred pounds being a good profit in grinding corn meal, this change shut the Kansas millers out of Texas business. Application was made to the Interstate Commerce Commission for relief. It then appeared on investigation that the carriers had made use of the Texas millers in order to prevent a general reduction of *both* grain rates and rates on grain products. The Texas millers on general principles had favored both these reductions. What happened is best described in the evidence before the Senate Committee on Interstate Commerce of 1905. "The railways went to the millers of Texas and they said to them, 'Is there anything you want here?' 'Why,' said the millers, 'yes; we would like to have that differential between corn and corn meal increased; we think you ought to put the rate on corn meal up.' The railway said, 'All right; you just stay away from that meeting down at Austin so that there will not be any excuse for the Texas commission, and if it undertakes to reduce these rates we will raise this differential; we will raise the rate on corn meal to the rate on flour.' The millers kept away from Austin—they kept their part of the bargain—and they stayed away, and the Texas commission was left without any support for their proposition to reduce the corn rates, and the railways kept their part of the bargain and lifted up the rate on corn meal so that the differential was from 9 to 7½ cents, and that put the Kansas mills out of business."

Apparently insignificant details often determine the outcome of commercial competition. Thus in the milling business where the margin of profit in the manufacture of flour may not be over 3 cents per barrel, an infinitesimal charge in the freight rate may mean success or failure to long-established industries. And the conditions vary indefinitely. Thus as between flour milling in Duluth and Buffalo, Duluth can buy its wheat from the farmer direct during the entire winter, but must ship its product mainly during the period of open water navigation on the lakes. The reverse is true with the Buffalo miller who can ship out his flour during the entire season, but who must accumulate his entire stock of wheat before navigation closes. And then Minneapolis as a milling center has to be taken into account. Eighty per cent. of the spring wheat grown in the United States is in territory from which the freight rate to Minneapolis and Duluth is the same. But the basic rate to the East and Europe, fixing the all-rail rates, is the combined lake and rail. By this route

Duluth is 150 miles nearer the market than is Minneapolis, and consequently enjoys a lower rate on its flour shipped out. A three-cornered competitive problem exists, in which any change at one point entirely upsets the commercial equilibrium.

The obligation on the part of one railway to protect its constituency, not only in respect to particular rates, but in general conditions as well, introduces still further complications. The freight business of New England, for example, consists, first, of the carriage of raw materials and supplies inwards; and, secondly, thereafter of the transportation of the finished product out to the consuming markets. Narrowly considered it may seem expedient to crowd the rate on coal as high as the value of service probably will permit; but viewed in a large way it may prove to be a far better business policy to maintain the rate on coal, cotton and other staple supplies so low that the growth of population and production may in the long run yield far greater returns on the high-grade manufactures which the territory produces. Turning to the Southern field, where the economic conditions are reversed, it may be the better policy to hold down the rate on raw cotton in order thereby to stimulate this great basic industry and thereby enhance the demand for the merchandise and foodstuffs which depend upon general prosperity. A free hand afforded for the suitable adjustment of such apparently independent services may contribute far more to the general welfare than an insistence upon a petty and near-sighted policy of extorting from each individual service all the rate it can possibly endure. American railway managers are gradually but surely coming to take a more liberal view of these great possibilities and to consider the economic development of their territories, not narrowly, but in a generous way.

(To be continued.)

THE JACOBS-SHUPERT LOCOMOTIVE FIREBOX.

Locomotive boiler design has not changed materially since the locomotive attained its present general arrangement. Certain modifications have been introduced from time to time, but in the main, locomotive boilers are built according to the same general design followed in the earliest type of horizontal fire-tube boilers. A radical departure from this general form is the Jacobs-Shupert type of locomotive firebox, here illustrated. In this, the usual flat firebox sheets and outer shell are replaced by sets of channel sections riveted together and the usual form, with troublesome staybolts, is replaced by stay sheets, except at the front and door sheets.

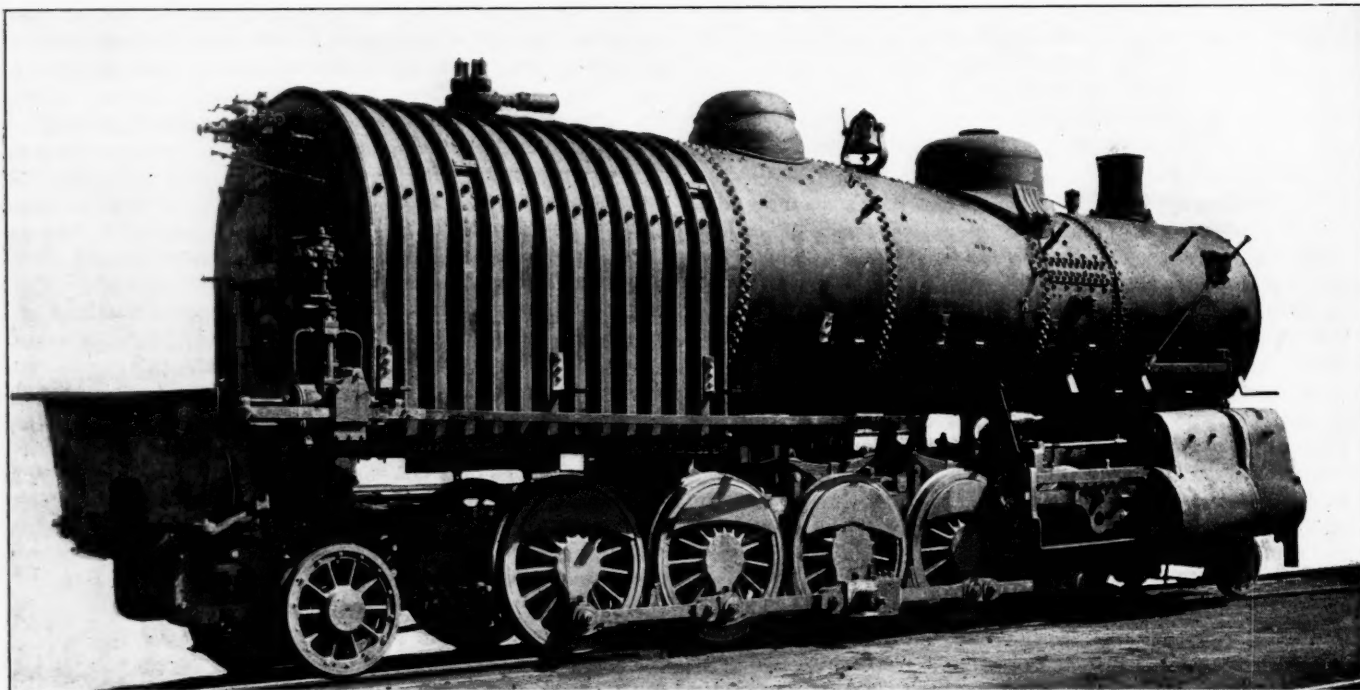
The Jacobs-Shupert firebox, as applied to the boiler of engine 917 of the Atchison, Topeka & Santa Fe, is composed of 13 built-up sections securely riveted together. These sections are connected by rectangular shaped openings through the stay sheets, which provide for horizontal circulation. Each section is built up of an inner and outer channel tied together by two perforated radial stay sheets, each stay sheet serving two adjacent sections. The lower portions of the sections terminate at a mud ring of ordinary form and the channel shapes are so modified at the mud ring as to make a smooth, continuous joint. The flue sheet and forward stay sheet are in one piece, extending from the mud ring at the bottom to the outside shell at the top; the inside door sheet and the back stay sheet also are in one piece. The firebox, formed by the assemblage of these sections, is connected to the barrel of the boiler by a throat sheet pressed from a single piece and flanged to conform to the flange of the outer shell channel. The back head is pressed to shape and flanged to conform to the flange of the outer channel also.

The channel sections forming the outer shell and the firebox proper are made from long narrow strips of steel. Each channel section is formed by pressing hot informers under the hydraulic press. The straight channel is then bent by

formers also operated by the hydraulic press to conform to the contour of the outer shell or of the firebox as required. As shown by the accompanying drawing of the horizontal section of the boiler and firebox, the webs of these channels are unlike in contour. The curvatures of the webs are so formed as to assume the natural curvature when under pressure and the arches formed by the inner and outer channels represent a construction that insures against undue and enormous local

All parts entering into the construction of this firebox are made by standard forms, dies and jigs. All similar parts are duplicates and perfectly interchangeable. It is therefore unnecessary to designate any part as any similar unit may be selected for any given place.

The straight channel sections are planed on the edges to the proper dimensions and beveled, a process much cheaper than the slow and expensive process of chipping. The finished



A. T. & S. F. Tandem Compound Locomotive, No. 917, with Jacobs-Shupert Firebox.

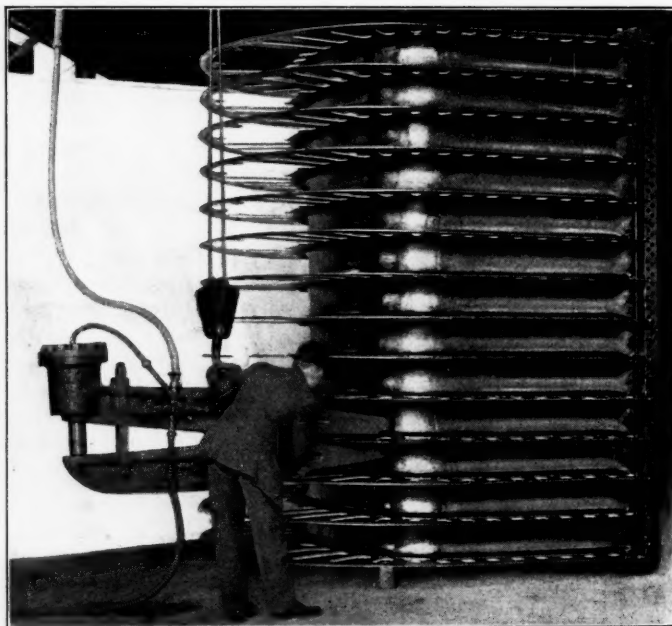
stresses resulting either from pressure or sudden changes in temperature. The channel sections are applied with their flanges away from the fire, thoroughly submerging all seams of the firebox proper and facilitating the work of riveting. The rivet heads are all submerged and there are no bolt heads exposed to the heat of the fire and hot gases.

The radial stay sheets are interposed between the flanges of adjacent channels of both the inner and outer sets and are secured by the same rivets that hold the channels. They thus serve to stay the firebox and the outer shell and also serve as calking strips. To provide for horizontal circulation of water around the firebox, the stay sheets are partially cut away, an opening of 16 sq. in. being made through each sheet at the mud ring, in addition to the other holes through the sheet.

The mud ring is of the ordinary form as applied to the usual type of flat sheet firebox. The application of the mud ring is one of the clever pieces of boiler making that characterizes the design and construction of the Jacobs-Shupert firebox and is really a remarkable achievement. Near the mud ring the flanges of the channels are partially straightened and reverse lapped. By flattening the flanges at the bottom of the channels, a continuous smooth surface is provided to which it is as simple a matter to apply a mud ring as to the usual sheets of an ordinary firebox. The reverse lap of the flange of one section fits snugly into the lap of the adjacent section and is secured by three patch bolts. To still further insure a tight joint, the lapped portions are welded by the autogenous process. As evidence of the effectiveness of forming and calking this connection to the mud ring, it is interesting to note that the joint successfully withstood a water test of 300 lbs. pressure as well as a steam test of 270 lbs. before being put into service and this joint has since given no trouble on the road or in the roundhouse.

straight sections are then reheated and are bent to the proper contour by special formers.

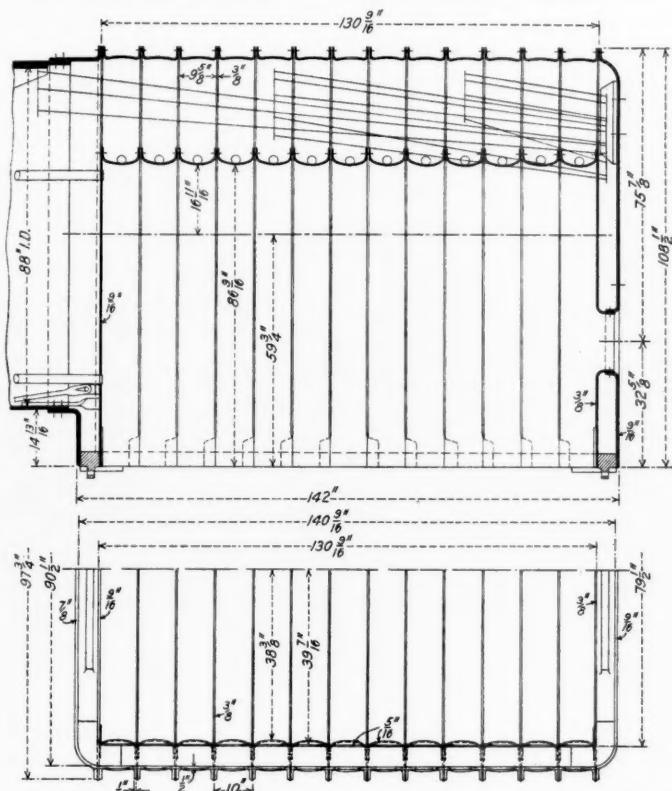
The radial stay sheets are cut from rectangular sheets of steel and for simplicity in construction and economy of material, each radial sheet is made in three pieces, all being cut from the single steel sheet. The pieces forming the water leg stays are cut from the waste material within the arch of the



Method of Riveting Through Channel Flanges and Stay Sheets.

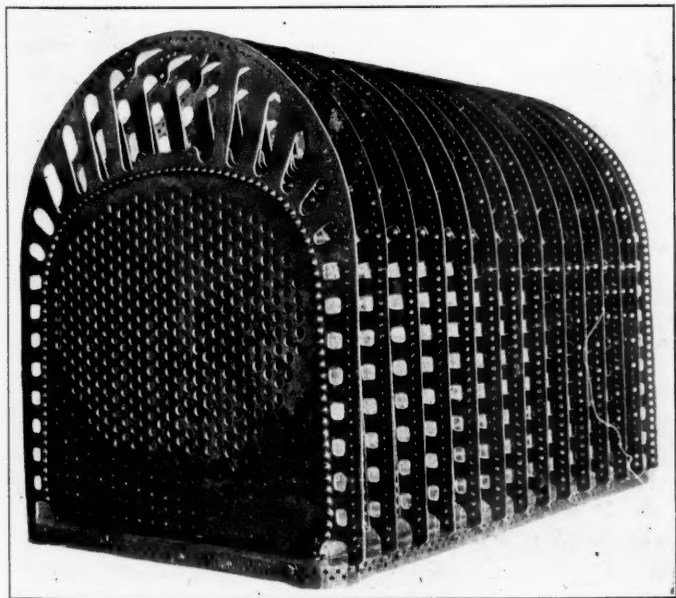
crown stay. The contour of each radial stay sheet is made to conform to the contour of the inner and outer channels. The back head and throat sheets are formed by special formers on the hydraulic flanging press. The firebox door sheet may have the door hole flanged by special formers operated by the hydraulic flanging press or by hand in the usual manner.

All rivet holes through the channel flanges and the corre-



Sectional Elevation and Half Plan of Jacobs-Shupert Firebox.

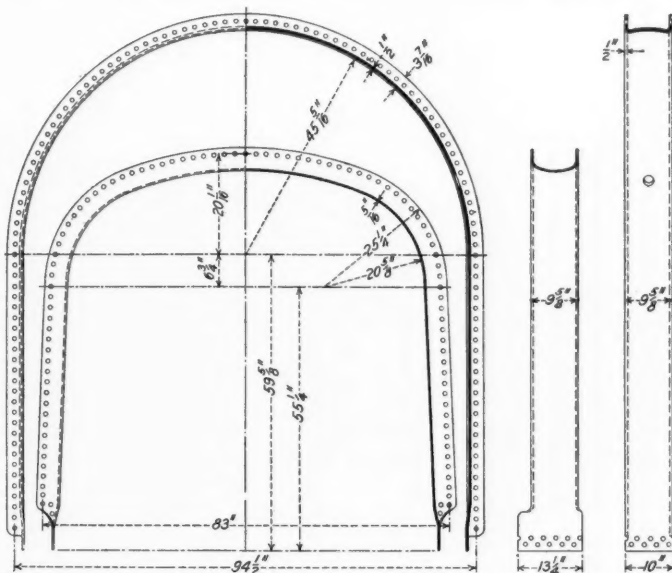
sponding holes through the edges of the stay sheets are drilled. No preliminary laying out is necessary, as the holes are drilled according to standard jigs or templets. Holes through the templets are bushed with case-hardened bushings made from soft steel. The jig for drilling the stay sheets, including the flue and firebox door sheets, represents a combi-



Jacobs-Shupert Firebox Partially Assembled.
Showing openings in radial stay sheets for horizontal circulation of water.

nation of the two jigs for drilling the inner and outer channels and it is thoroughly checked by these two. By the use of these three templets, the rivet holes through the component parts of the firebox are in perfect alinement, a feature by which the difficulty of assembling is reduced to a minimum. So perfect is the alinement of these holes, that when the firebox is assembled and bolted temporarily before riveting, it is possible to sight through any row of holes.

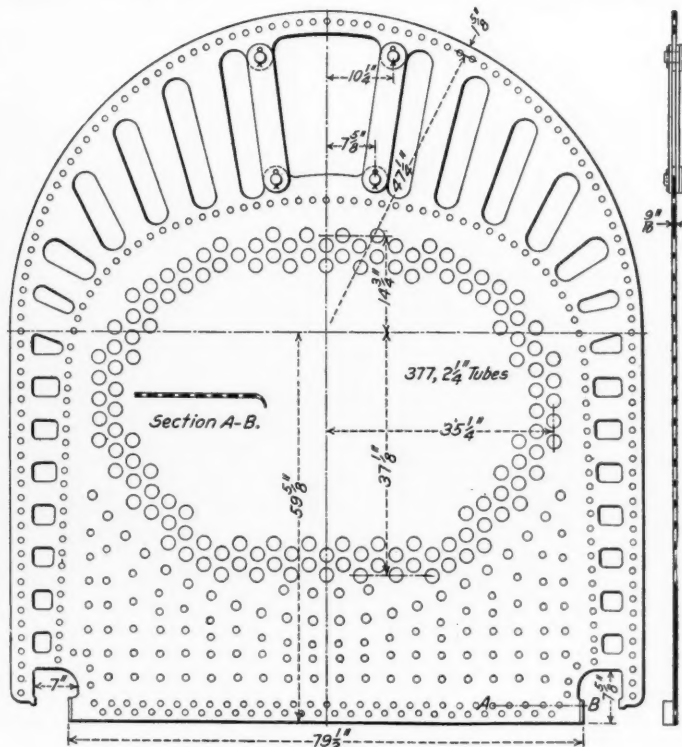
In assembling the Jacobs-Shupert firebox, the channels of the firebox proper and the stay sheets are riveted together and



Elevations of Outside-Shell and Firebox Sections of Jacobs-Shupert Firebox.

the fire door and flue sheets are next riveted to the end sections. This completes the shell of the firebox proper and the seams are then calked both inside and out. The mud ring is next bolted in place and the mud ring rivet holes are drilled in the firebox shell.

The next operation is to lay up and rivet the channel sections of the outer shell and this is done preferably by begin-

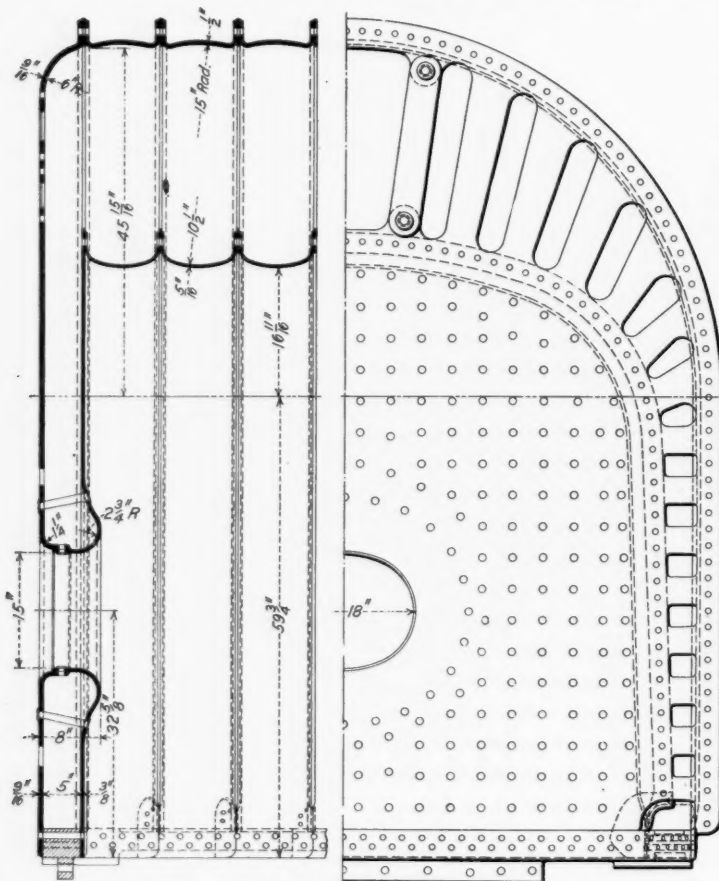


Back Flue Sheet.

ning at one end and riveting up section on section throughout the length of the firebox. The outer shell is completed by laying up and riveting the back head, together with the stays that brace it. The mud ring is next laid up with the outer shell, the mud ring rivet holes are drilled through the outer shell section and the mud ring is riveted and calked. The throat sheet is laid up and riveted to the barrel of the boiler after which the flange of the end section of the firebox is riveted to the flange of the throat sheet.

To facilitate the work of riveting the sections of this firebox, a special hydraulic jaw riveter, capable of working in close quarters, has been devised. This riveter was designed and built at the Topeka shops of the Santa Fe and is here shown in operation. The water supply and discharge are conducted by flexible metallic hose allowing freedom in the movement; the riveter is suspended at a point immediately above the center of gravity.

By forming all of the component parts of this firebox with

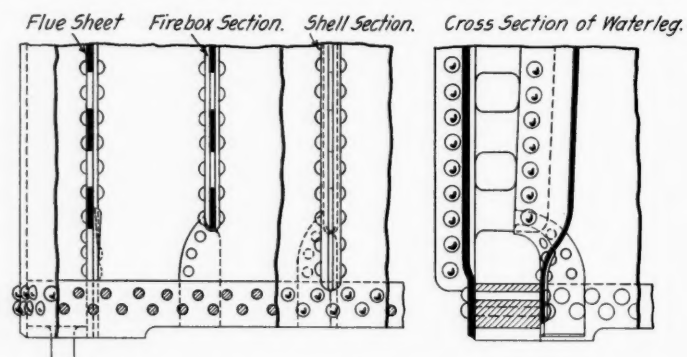


Half Elevation and Section Through Back Head and Door Sheet.

standard formers and dies and by drilling all rivet holes according to standard templets, all units are alike in their essential features. By assembling the parts and riveting them with a specially designed riveter the work is done in a uniform and efficient manner. The design and construction of this firebox have not been prompted by a sudden impulse. On the contrary, the firebox is a development from several years of continuous study and investigation by men in position to observe locomotive operation closely, one of them a practical boiler maker foreman. Certain definite results have been sought and the Jacobs-Shupert firebox has been built with the idea of accomplishing these results.

The peculiar construction of this boiler provides a number of advantages not obtained by the usual form of firebox and produces economies which represent a decided improvement over the former type. While much investigation has been made during recent years to improve steam distribution and

to develop devices for securing economy in the use of steam, comparatively little has been accomplished in the development of the locomotive boiler itself. Attempts at improvement have included a decided increase in size, a slight alteration of the general form, the occasional introduction of water tubes, or the combustion chamber, and the widening of the water leg.



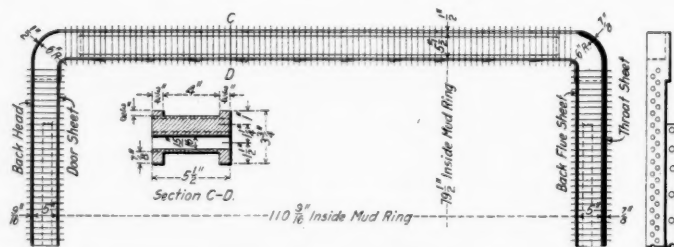
Method of Reverse Lapping of Sections to Fit Mud-Ring.

The demand for greater tractive power has caused the enlargement of grate areas and the shape of firebox sheets and outside shells has been somewhat modified. In general, however, the same old method of forming fireboxes and staying the sheets has been adhered to until the present.

Considering the essential difference between the ordinary form of flat sheet firebox and the Jacobs-Shupert type, it is readily apparent that the latter has been designed and developed according to principles for securing economy in the generation of steam and for relieving strains due to temperature stresses.

The deep corrugation in the sections of which the firebox shell is made increases the available firebox heating surface without enlarging the grate area. About 44 per cent. of the total evaporation in a locomotive takes place around the firebox and any increase in the firebox heating surface produces a greater increase in the efficiency of the boiler than is produced by an increase of flue heating surface. A further improvement in the heating surface provided by the introduction of corrugated sections results from placing the heating surface as nearly as possible at right angles to the currents of hot gases. This construction causes a turbulent motion among the currents of gases passing the surface and increases the amount of available heat absorbed.

The continuous corrugated or rolling surface is most effective in interrupting and disturbing the flow of hot gases. The rotation, or whirl, given to the gases as they pass or come in contact with the irregular surface of the firebox, gives them the necessary motion to bring successive portions of the gases in contact with the metal. It has long been recognized by the highest authorities in heat transmission that such a whirling, scouring action of the gases is necessary for highest



Details of Mud-Ring.

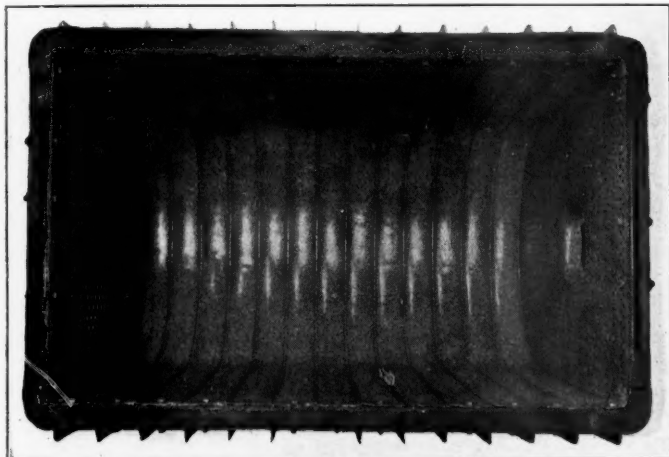
efficiency in transmitting heat from the gases themselves as well as in causing them to break through the film on the surface of the metal to the body of the metal itself.

The effect upon evaporation and water circulation produced by the corrugated sectional construction is decidedly bene-

ficial. The space between stay sheets is $9\frac{1}{2}$ in. wide and the stay sheets are but $\frac{3}{8}$ -in. thick. Compared with the vertical rows of staybolts $1\frac{1}{16}$ in. in diameter, and spaced on 4-in. centers, the obstruction to vertical circulation is largely reduced. The greatest circulation around any firebox is vertical and the removal of impediment to vertical circulation tends to keep the water in rapid motion, accelerating the scouring action of the water against the metal of the firebox and increasing the rate of heat transmission through the metal.

By producing a scrubbing action of the gases on the fire side of the metal and by accelerating the scrubbing action of the water against the hot surface of the metal, the evaporative value of the heating surface is largely increased and the evaporation per square foot of heating surface of the sectional form of firebox is more rapid than that of the ordinary flat sheet firebox.

The holes for horizontal circulation through the stay sheets are of ample area to replace the water evaporated. The direction followed by water replacing that water which has risen as a result of being heated, depends upon the source of supply. The barrel of the boiler constitutes the source of supply for the water legs and the demand upon this supply is caused only by evaporation. As the water around the firebox is evaporated it is replaced by water from the barrel of the



Interior of Firebox.

boiler and the function of horizontal circulation is to supply this water only.

Less than 50 per cent. of the water delivered to a locomotive boiler reaches the firebox, the remainder being evaporated by the tubes. When it is considered that the area of a check valve is $2\frac{1}{2}$ sq. in., or less, and that less than one-half of the water reaches the firebox, there can be no doubt that the holes through the stay sheets are of ample size.

Expansion and contraction of metal due to changes in temperature invariably set up forces in the metal that are practically irresistible. In the usual form of locomotive firebox there is no provision against the excessive strains due to temperature stresses. The entire structure of the flat sheet firebox is rigid and these temperature stresses cause cracked side sheets and broken staybolts.

The arched, sectional form of construction provides for the expansion and contraction due to variations in temperature and each section is free to expand or contract without producing excessive local stresses or transmitting undue stress to adjacent sections. The entire structure is flexible and while expansion and contraction occur, the form and construction of each section allows it to expand without straining the next section, thus relieving any stresses induced by temperature variations.

The sectional form of construction provides an unusual element of safety. Due to the sectional form, the firebox is less

liable to violent explosion than a firebox built of the usual large sheets. A possible rupture is confined to a single section and cannot extend to adjacent sections. It is the sudden tearing away of a large area in cases of failure in the ordinary crown sheet, that causes a violent explosion and consequent disastrous results. In the sectional firebox this area is restricted and the destructive effects of an explosion would be confined to the simple escape of the contents of the boiler.

THE PASSENGER RATE OF THE AMERICAN RAILWAY.*

BY WILLIAM S. BRONSON.

Assistant General Passenger Agent, Chesapeake & Ohio.

When the first railways were built the necessities of travel required but one rate of fare, covered by a simple local ticket. As soon as connecting railways were built, however, public needs and conveniences demanded through ticket and baggage arrangements by which the traveler could obtain at his starting point at a price equal to the sum of the combined local fares of the two connecting railways a ticket that would carry him and his personal baggage to his destination on the connecting railway. From this public demand grew the coupon, now designated the interline ticket, which, at that time, consisted of two parts, providing one passage token or coupon of record for each line making up the through route.

Beginning with the forties the tide of immigration surged westward and lines of railway were built, first southwest from Lake Erie and convenient for steamer connections, and then to the Mississippi and Missouri rivers. In order to share in competitive traffic the longer line or route was necessarily compelled to make the same charge for the same service as the more direct line or route, and as competition extended through routes, consisting of two or more lines of railway, were formed, and in turn were compelled to meet the charges of the more direct routes. Thus appeared through rates of fare of a less amount than the sum of the local rates of the connecting railways forming the through route covered by a ticket limited in time to practically a continuous trip, and as each railway forming a part of the through route must necessarily share in the through rate the simple mileage prorating system was devised.

As the lines of railway expanded so did the rate and ticket systems develop, until to-day there exists on the railways of the United States a most elaborate and comprehensive system of through rates and tickets by which the traveler is enabled to purchase at any point on any railway a through ticket, with through baggage privileges, to any point located in the United States, Canada or Mexico, and, in fact, to any principal point in the world reached by rail or steamship. This privilege is not confined to the shorter or more direct route, which, thanks to competition, does not necessarily afford the better service, but is available at the same cost *via* many routes.

When railways were first established the people, trained by horse, stage coach and canal experience, looked upon a journey as a bugbear never to be undertaken save from sheer necessity, and so the ancient passenger tariff, or book of rates, included only the one-way local fare, at a fixed price in cents per mile. But as the country's population grew and wealth increased new causes for travel developed, and the railways, quick to recognize the "bargain feature," conspicuous as a source of to-day's passenger revenue, rapidly established for various travel causes additional reduced rates of fare predicated on business and social conditions designed to create travel. To-day we find the following rates of fare generally in use:

MAXIMUM RATES OF FARE.

Local One-Way Fares.—These are the established rates of fare available at all times for tickets covering the trans-

*Copyright, 1908, by William S. Bronson.

portation of an individual one way between two points on the same railway, designed to meet the wants of the one-way traveler and produce the bulk of local revenue.

Interline One-Way Fares.—These are the established rates of fare for tickets covering the transportation of an individual one way from a point on one railway to a point on another railway, designed to meet the wants of the one-way traveler and produce the bulk of interline revenue.

LESSER RATES OF FARE.

Local Round Trip Fares.—These are the established reduced rates of fare available at all times for tickets covering the transportation of an individual from a point on a railway to another point on the same railway and back to the starting point, designed to meet the wants of the round-trip traveler and to minimize the payment of cash fares on trains.

Interline Round-Trip Fares.—These are the established reduced rates of fare for tickets covering the transportation of an individual both ways from a point on one railway to a point on another railway and back to the starting point.

Mileage Fares.—These are established reduced rates of fare for tickets covering 500, 1,000, 2,000 or 5,000 miles of travel annually by an individual between points on one line of railway and often interchangeable over several lines of railway. They are designed to meet the wants of the wholesale traveler or the person whose business requires a considerable travel. In some cases these tickets are now good for the travel of bearer or one or more persons, and in some few instances their time as to use is unlimited. The mileage ticket, while it produces but a small percentage of railway earnings, is, nevertheless, a most important rate factor, constituting practically a wholesale maximum rate as against the one-way rate of fare, which might be termed a retail maximum rate. The mileage ticket is generally considered the pendulum of the entire rate adjustment on lines whose maximum one-way rates of fare exceed their mileage rate.

Commutation Fares.—These are established reduced rates, payable weekly, monthly and quarterly, and available at all times for tickets covering 10, 48, 60 or 120 one-way trips of an individual, and in some cases of a member of his family, between cities and adjacent towns and places. They are designed to build up the suburb and to accommodate the many persons who work in the city but reside outside. Commutation fares are generally fixed for reasons of policy and not as a direct source of revenue for the railway, though no doubt this traffic is directly profitable to certain railways at the greater cities.

Local Party Fares.—These are established reduced rate *per capita* fares covering the transportation one way of parties consisting of not less than a given number of persons traveling together between points on the same railway and designed to meet the wants of theatrical companies, baseball and football clubs, bands and kindred organizations. On many railways these fares are open to parties comprising the required number of persons without regard to their occupations, while on other roads the fares are confined to the use of organized parties only.

Interline Party Fares.—These provide for interline traffic an equivalent fare to the local party rates for traffic between points on the same road.

Local All-Year Tourist Fares.—These are the established reduced rates of fare available throughout the year for tickets covering transportation to local tourist resorts and return.

Interline All-Year Tourist Fares.—These perform the same function for the interline tourist that local tourist fares do for the traveler whose journey is confined to a single road.

Local Summer Tourist Fares.—These are temporarily established reduced rates of fare, available only during the summer season, for transportation of an individual to summer resorts located on the originating railway and return. Interline summer tourist fares are also issued.

Local Winter Tourist Fares.—These are the temporarily re-

duced rates of fare available only during the winter season for transportation of an individual to winter resorts located on the originating railway and return. Interline winter tourist fares are also issued.

Local Excursion Fares.—These are the temporarily established reduced rates of fare available only at a given time, on a given day, or during a limited period for local excursion tickets, designed to meet the wants of the pleasure seeker, the visitor to meetings and gatherings, and the attendants of conventions of business, religious or social organizations, thus to encourage travel and create local revenue. Interline excursion fares are also issued.

SECOND CLASS ONE WAY FARES.

This classification covers only immigrant fares, which are not in general use, and are only available under certain circumstances.

PASSENGER RATE ADJUSTMENT.

If we except those states where low maximum rates of fare have been forced upon the railways by state legislation, and those few eastern states where the density of population is so great that passenger business can be profitably conducted on the street car principle of one rate of fare under all circumstances, we can very justly term the United States a sparsely settled country as yet. It has not the requisite population located along its railway lines to impel a consistent travel sufficient to produce fairly remunerative returns without recognition of the bargain feature. Therefore, in dealing with the subject of passenger rate adjustment, we are applying our theory to the United States in general, sparsely settled as a whole, even thinly settled in the western sections—and we eliminate from consideration the few densely settled states and the states with laws fixing maximum rates of fare so low as to discourage the railways from meeting various special causes for travel with specially low rates. The theory of passenger rate adjustment is that a rate of fare be established for various causes for travel, obtaining an average rate which, multiplied by the number of miles obtained from all causes for travel, will produce fairly remunerative returns.

As state laws are based on the needs of the citizen in general, and not on those of particular classes of citizens, so must the railway, in order to secure fairly remunerative returns in our comparatively sparsely settled country, adjust fares to the needs of travel in general and not for particular classes of travelers, on the principle that, there being no class distinction in the United States, the individual who to-day pays the maximum rate, to-morrow pays the lesser rate, and always the lowest rate that may be available. This tendency, to be discussed subsequently, must be considered the complicating feature of the rate adjustment. The records of the Interstate Commerce Commission show that the average rate on the American railway is but two-thirds of the average maximum rate.

It must be remembered that the Constitution of the United States guards against class distinction in persons, and, under a Republican form of government, railways must operate on Republican principles. So, if we except the immigrant ticket, and some few second class tickets which differ from first class tickets only in that in one case the traveler is privileged to use standard sleeping or parlor cars upon additional payment, while in the other case the traveler is restricted to coach accommodations, we have in general use but one ticket. The various forms of tickets covered by the maximum and lesser rates of fare differ not in class but in privilege, such as limit, stop-over or the excursion privilege. Therefore, in applying the theory of rate adjustment, we neither fix rates of fare to fit the needs of the lower classes, the middle classes and the upper classes, respectively, as on foreign railways, nor do we fix rates of fare to suit the respective needs of the rich man, the man of moderate means or the poor man. There is but one ticket in general use.

(To be continued.)

NEW UNION ELECTRIC INTERLOCKING.

The Union Switch & Signal Company has recently installed at Sterling, Ohio, at the crossing of the Baltimore & Ohio with the Erie, an electric interlocking plant in which each lever, with its appurtenances, is complete in itself so that it can be easily taken out, as is done with the rectangular syrup receptacles in some styles of soda fountains. This plant has been in operation for some time and the builders report that it is giving satisfactory service. They send us the following:

The apparatus on the ground is similar to that which has been installed by the Union Company for some years. The

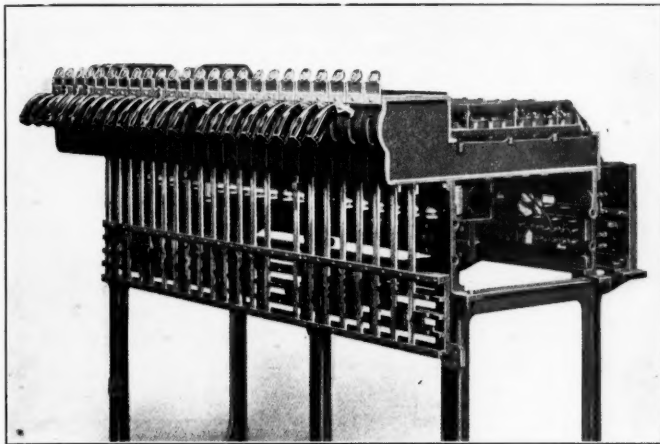


Fig. 1—Union Electric Interlocking Machine.



Fig. 2—Rear View—Union Interlocking.

switch and lock movement is the same in all respects, except that the motor armature has two independent series of coils, each connected to a commutator. During the movement of the switch, the two sets of coils are in series and act jointly as a motor to drive the mechanism. At the end of the movement the driving current is switched over to one set of coils, which results in raising the potential of the two sets in series, so that a higher potential is produced at the motor than exists at the battery. This results in a current flowing towards the positive pole of the battery through one coil of the indication apparatus. The other coil of the indication magnet is energized by the current which drives the motor.

The switch and lock movement and circuit controllers, including the magnetic controller which guards against improper movements, are the same as used by the Union for some years.

The interlocking machine is called the "multiple unit" design. Each lever is an independent unit in itself, and may be removed from the machine by taking out a few screws. The lever movements are novel. The first movement is a longitudinal movement, which actuates the mechanical locking in the machine. The medial movement is a movement in the arc of a circle; this operates the circuit controller on the switch or signal circuit. The final movement is a longitudinal movement, which takes place only after the indication has been received, and results in the release of certain mechanical locking. The final movement is made by a spring, and is automatic. The operator makes the preliminary movement and the medial movement, after which, when the indication is received, the lever automatically goes to its final position.

The indication apparatus comprises a polarized magnet, without permanent magnets, however. The polarization is effected by the driving current to the motor passing through one of the magnet coils. The other coil must then have current in a certain direction relative to the driving current in order to actuate the latch. This coil is also connected to the positive side of the battery, and current must flow towards the positive pole of the battery to be in the right direction to energize the magnet. To cause current to flow in opposition to the battery is the purpose of the two sets of coils on the motor armature. As is well known, the counter-electromotive force of a motor, when running light, is nearly equal to that of the source supplying the current. The difference between the two is due to the fall of potential in overcoming the resistance in circuit. This difference, when the motor is running light, is not more than 10 per cent. of the total voltage of the source. When the motor then is driven through one set of coils on the armature, the counter-electromotive force of this set is nearly equal to that of the battery; and since the other set of coils is rotating at the same speed in the same magnetic field, its counter-electromotive force is the same as that in the set driving the motor. The sum of the two then is nearly double that of the battery. The result is that a potential nearly double that of the battery is produced at the motor, so that the current can be readily caused to flow towards the positive pole of the battery, or in a direction opposite to that in which the current should come from the battery. This arrangement of the circuits and motor coil makes the apparatus absolutely safe against the giving of false indications by foreign currents, for the current could not possibly flow from the indication magnet coils in the right direction if it came from a wire which was accidentally crossed with the indication wire. A false indication could not result from the wire being crossed with the indication wire to another switch which was in the act of indicating, because unless the switch had completed its movement and a change in circuits been made at the motor, the potential would be held down by the motor which had not reached the proper point for indicating; for the potential at this motor cannot equal that of the battery until after the change in the circuit has been effected by the movement of the mechanical controller at the switch.

Fig. 1 is the front view of a "multiple unit" machine, showing the locking frame (vertical), and Fig. 2 is a back view of the same machine showing the terminal board and arrangement of wiring. When set up for use the whole machine is enclosed in an oak case with glass panels in the top.

The dwarf signals in this interlocking are actuated by a solenoid with battery indication. This is arranged so that current must flow in two wires in certain relative directions in each, in order to actuate the magnet, and by similar means the signal is protected against being cleared improperly.

In the high signals but one slot arm is employed for operating a 3-position signal, and the method of indicat-

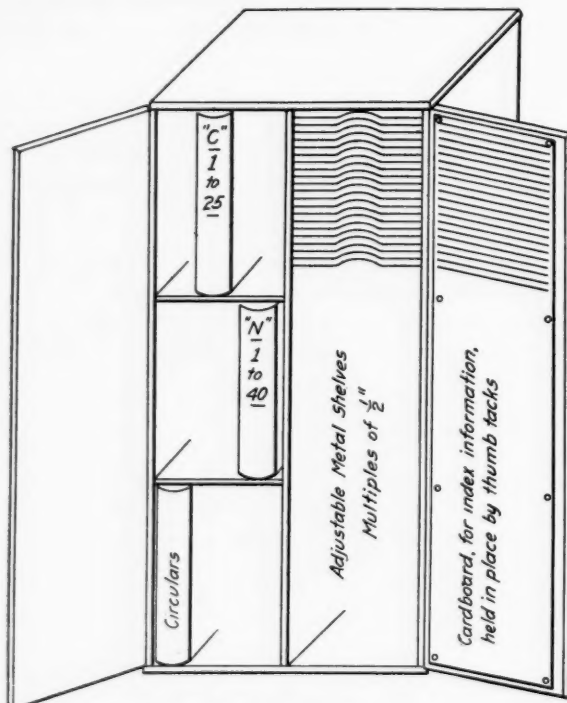
ing is the same as that which is used for switches.

All material for this plant was furnished by the Union Switch & Signal Company and the work was installed by its forces, under the direction of W. H. Willis, Signal Engineer of the Erie, and F. P. Patenall, Signal Engineer of the Baltimore & Ohio.

TARIFF FILING CASE; PENNSYLVANIA LINES.

BY C. R. FRENCH.

The Pennsylvania Lines West of Pittsburgh are installing a tariff filing case at all stations to comply with the requirements of the Interstate Commerce Commission, in the matter of the provisions of Section Six of the Act with regard to posting tariffs at stations and modifications thereto. After an investigation extending over a period of several months, during which an exhaustive study of all manner of filing devices was made, the case as shown on the accompanying sketch was adopted. It is a distinct departure from former tariff filing methods and it is believed will give the agent a complete system. The cases are of mission oak oil finished, 40 in. high, 21 in. wide and 13 in. deep, divided by a partition into two compartments, that on the right-hand side being grooved for shelves in multiples of one half inch, while the left-hand side has three shelves, on which are placed nine "Tengwall" binders, three to a shelf. Two doors are used, each exposing one half of the case. In addition to the requirements of the Commission for filing tariffs, it is the intention



Tariff Filing Case.

of the Pennsylvania Lines to keep all circulars, general notices, instructions to agents, percentage sheets and the bulletins of tariff changes in the case.

The basis or key to the working of the case is the tariff index or Agent's Ready Reference Index, which lists the tariffs applicable from each station in the system. The tariffs are divided into six groups, those lettered "C," being applicable to Central Freight Association territory; "E," Trunk Line territory; "N," northern territory and Canada; "S," southern territory; "T," trans-continental territory and "W," western territory.

Each tariff issued by, or to which the Pennsylvania Lines is a party, is given a file number under one of the six groups, according to the territory to which it applies. These tariffs

are then shown in the Ready Reference Index under the stations from which they apply, each station having its number, as "PF 1," Pittsburgh; "CP 76," Cleveland; "WV 38," Toledo; etc.

The "Tengwall" binders contain tariffs bearing tariff file numbers with the prefix letters "C," (all issues,) "E," (Nos.

"Fort Wayne Route."	
Pennsylvania Company.	
TEMPORARY SUBSTITUTION SHEET	
-FOR-	
I. C. C. _____ (C. R. C. _____), (R. C. O. _____), (I. R. C. _____), (R. & W. C. _____).	
Freight Tariff	
-APPLYING ON-	
-FROM-	
AND OTHER POINTS NAMED IN TARIFF To Points in	
<div style="display: flex; justify-content: space-between;"> <div> Issued _____ 190__ </div> <div> Effective { Interstate _____ 190__ State _____ 190__ </div> </div>	
By _____	
THIS TARIFF NOT NOW AVAILABLE; SUPPLY EXHAUSTED.	
Copy of this tariff is on file in Complete Public Files of this Company's Freight Tariffs, located at Room 806, Union Station, Pittsburgh, Pa. Room 906, American Trust Building, Cleveland, Ohio. 2 and 4 Sherman Street, Chicago, Ill.	
This tariff will be reissued, superseded or canceled and copy of new issue filed herein.	

Temporary Substitution Tariff Sheet.

1 to 53) and "N," (all issues). Between each file number is a cardboard divider with an index tab, on which is placed the prefix letter and file number, these, of course, being arranged numerically.

All circulars, instructions to agents, general notices and notices of a permanent nature are filed in another binder. A base index, comprising forty-eight subjects and covering all subjects about which circulars may be issued, is used as a guide. Every circular, instruction or notice, no matter by whom issued, pertaining to a certain subject, is filed under its subject number, so that when an agent wants information on any subject he has it all together in one place. Dividers separate each subject and the tabs shows the subject number.

All percentage sheets are filed in two binders, each sheet bearing a page number, according to an index published showing all issues.

Another binder has dividers for 31 days, corresponding to the days of the month, for bulletins of tariff changes. For each new tariff or supplement issued a bulletin sheet must be placed in the bulletin binder under the date on which the tariff or supplement will become effective and must be so filed at least thirty days prior to the date effective. The bulletin binder must be examined daily and all changes shown under the date made, cancelled tariffs or supplements being destroyed.

On the metal shelves (39 in number) are placed the balance

of the tariffs of the "E," "S," "T" and "W" numbers. On the door opposite the shelves a cardboard is placed, slightly smaller than the door and ruled every half inch, on which an index of the contents of the shelves is written together with the file number and prefix letter.

When a new tariff or supplement supersedes one already in the file the old one is marked

"VOID AFTER

(date)

SEE (new tariff number)"

and the new tariff or supplement is placed under the old one until the date arrives for it to take effect, when the old one is destroyed. The destruction of the obsolete tariffs and supplements is made sure through the bulletins.

In case a tariff or supplement applying from a certain station is not on file and cannot be secured, a "dummy" sheet is put in the file in place of the original, which sheet shows the number, date effective, to and from what territory and

"Fort Wayne Route."

Pennsylvania Company.

BULLETIN

—OF—

FREIGHT TARIFF CHANGES.

Effective _____, 190__

Tariff I. C. C., _____ R. C. O., _____ I. R. C., _____ R. & W. C. I., _____

OR

Supplement _____ to Tariff I. C. C., _____ R. C. O., _____ I. R. C., _____ R. & W. C. I., _____

Pages _____

Applying on _____

From _____

To _____

☒ The new issue described above is posted in Agent's Tariff File No. _____

Agents must examine the Bulletin Binder daily and remove from compartment corresponding with that date the Bulletin of Freight Tariff Changes, and also remove from Agent's Tariff File and destroy canceled tariff or tariffs, supplement or supplements expiring on that date.

Bulletin of Freight Tariff Changes.

the commodity on which the tariff applies, together with a printed notation to the effect that the original tariff cannot be obtained, but will be supplied as soon as possible, or that it will be reprinted.

At the larger stations an additional case is installed, which contains shelves on both sides and in which the Official Guide, Bullinger's Guide, southern and western local tariffs, inbound tariffs, routing, loading, carding and billing instructions, city directory and other things of this nature are filed, the idea being to get all the agent's "tools of trade" together in convenient form and handy for his use. The case is so made and arranged as to be a unit and any number of cases necessary may be used. It is expected that at some of the largest stations more than two cases will be required.

A. R. A. REPORT ON CAR EFFICIENCY.*

The work of the committee in collecting and publishing statistics has been continued. The bulletins covering car surpluses have tended to confirm the growing impression of the public that the railways have, in general, done all that could be expected in the provision and improvement of facilities. Although the surpluses are to-day about what they were a year ago, the shop car situation indicates a considerable improvement in business conditions. The bulletins covering general statistics taken in connection with the surplus reports show that the efficiency of cars actually in use is well maintained, and indicate that when an increase of business provides an additional incentive an increased efficiency may be expected.

The increased competition forced upon the railways by the hard times has tended to the making of concessions to the public, creating a decrease in car efficiency, but, notwithstanding this, the demurrage rules have been well maintained and in certain cases extended. Marked progress has been made in the application of demurrage to tidewater coal, and there are prospects of an improvement in the export situation. Even in the case of lake coal demurrage, where it has been impracticable to apply the rules at all points through the whole season, it is fully understood that they will be restored on the first symptom of car scarcity.

The committee, at the request of the General Superintendents' Association of Chicago, has made an extensive investigation of the interchange question in parts of the Chicago district, and at the request of the General Managers' Association of St. Louis the switching reclaim question in the St. Louis district.

Since the Interstate Commerce Commission, at the request of your committee, instructed its inspectors that the setting back at interchange points of cars with defective safety appliances was not necessary, a better understanding and a quicker interchange has been secured at many points.

The work of the clearing house in the line of clearing car hire balances has been decidedly increased. The amounts cleared at the last monthly settlement aggregate \$1,110,600.79. The clerical and other expenses which are borne by the subscribers amount to \$157 monthly. Superintendence is furnished by the committee.

It is thought that any plan for settling car hire on a car balance will involve the establishment of some central bureau or clearing house. The experience in the detail of handling these balances which has been acquired by the clerical force of this committee will be at the service of any such bureau.

General Statistics.

The monthly bulletins of car balance and performance have been continued. Owing to the enforced reductions in the offices of a number of railways the receipt of information for use in these bulletins has, in some instances, been delayed, resulting in the issues falling somewhat behind. However, the reports covering periods of depression are of less value as current operating reports than as historical statistics, for which purpose they are sufficiently close to date.

Reports of Car Surpluses, Etc.

The surplus and shortage bulletins continue to record large surpluses, with practically nothing on the shortage side. With the report for November 11, 1908, there was a slight reaction from the steady reduction. On January 6, 1909, the total surplus was 333,019, the highest since August, 1908. With the bulletin for January 20, 1909, the total dropped to 311,664, since which time there have been further decreases.

In comparing these figures with those for previous periods consideration should be given to the shop cars, which are not included in the surplus figures. During July and August, 1908, the number of bad order cars averaged over 200,000, or more

*Extracts from the report of the Committee on Car Efficiency, of the American Railway Association, Arthur Hale, chairman, presented at the New York meeting, May 19.

than 100 per cent. above normal. This number has since been reduced, and about 100,000 cars thus added to the available supply on which the surplus figures are based.

As opposed to this, some allowance should be made for the gradual reduction in equipment which has resulted from an almost total suspension of car building. It is true that this has been minimized by a similar suspension in the general retirement of old cars, but it is probable that the net decrease in equipment during the past years has been close to 1.5 per cent., or something over 30,000 cars for the entire country.

Car Location, Distribution, Etc.

The existence of a surplus resulted in a curtailment of car interchange and the return under car service rules of such equipment as was loaded off the home line. The reports indicate that after the general equalization, which took place during the early part of 1908, the general balance has been preserved with very little increase in the proportion of empty mileage.

Performance of Cars During Times of Shortage and Surplus.

One of the chief objects aimed at by the committee in the compilation of statistics was the study of freight car performance under changing conditions. So far as pertains to that particular object, it is fortunate that the information collected covers periods of car shortage and surplus, as we are thereby furnished with comparisons that will be invaluable in guiding future action by the association in devising methods for the efficient and economical handling of freight cars. * * * In April, 1907, with a shortage approximating 100,000 cars, the proportion of cars on their home lines was only 54 per cent. of the total railway ownership. If the private cars in service are added to the ownership the per cent. of home cars to the total in use is only 51 per cent. As the shortage disappeared and was replaced by a surplus the per cent. of cars at home increased, reaching 62 per cent. in August, 1907.

When cars again became scarce there was another exodus of home cars, which was checked, however, by the panic of October, 1907. With the increasing surplus during the first six months of 1908 the return of cars to their owners developed into a veritable rout, and by April, 1908, 78 per cent. of the freight cars in the country were at home. It is a significant indication of the extent to which the interchange of freight cars has developed during the past few years that even in the face of the almost unprecedented conditions that obtained during the year 1908 the interchange requirements equaled 22 per cent. of the total equipment. Indeed, if we base our figures on the active cars, which were but 75 per cent. of the total, the percentage would be close to 30 per cent.

Closely connected with the fluctuation in balance is the percentage of loaded car mileage. From a loaded movement of 69.3 per cent. in July, 1907, with a homeward flow of equipment, the excellent average of 72.9 per cent. was reached in October, 1907, when the number of cars at home had been reduced to 58 per cent. The decrease from this figure with the renewal of the return movement was most marked, and in January, 1908, only 61.4 per cent. of the total freight car mileage was made under load.

Demurrage Rules.

Your committee has continued its activity in endeavoring to have uniform rules adopted, and is in active correspondence with the different demurrage bureaus, although no material changes have been made since the last report. With the exception of the Canadian bureaus, all but three have changed their name from "Car Service" to "Demurrage Bureaus."

Holding Freight in Cars for Export and Coastwise Trade.

Officials of lines handling export freight at the Atlantic seaboard have asked your chairman to take this matter up with the roads leading to other ports, with a view of bringing all of the ports into harmonious working, and he is now engaged in this investigation. Demurrage rules on bituminous coal at tidewater are now being maintained by all lines at all ports on the Atlantic coast. Demurrage rules on coal at the lake

have not been rigidly enforced, on account of the large surplus of empty coal cars in that territory.

Light Loading of Cars.

While no change has been made in the minimum carload weight in Southern Classification Territory, such as was made in Official and Western Territory, yet from time to time changes are made as the classification is reissued which have raised the standard minimum from 24,000 lbs. to 30,000 lbs., provided the article will stand this minimum weight and the traffic will bear it.

Reductions in Free Time.

The committee is still watching the amount of free time allowed before demurrage accrues in different parts of the country and presents the two statements following, showing (1) by districts where and under what conditions more than the standard time is allowed (the standard is 48 hours for loading or unloading and 24 hours for reconsignment), and (2) an abstract of state laws and regulations on this subject.

Free Time Allowed by Demurrage Bureaus.
(See explanation in text.)

BUREAU.	COMMODITY.	TIME ALLOWED.	ACCOUNT.
Alabama.....	Grain.	48 hours.	Milling in transit.
Baltimore and Washington.	Grain.	48 hours.	Milling in transit.
British Columbia.....	Coal, coke and lime.	72 hours.	Unloading.
Canadian.....	Lumber.	72 hours.	Loading and unloading.
Central New York.....	Coal, coke and lime.	72 hours.	Unloading.
Chicago.....	Lumber.	72 hours.	Loading and unloading.
	All freight.	48 hours.	Reconsignment.
	Coal.	48 hours.	Reconsignment.
		96 hours.	Reconsignment (except by some roads).
Cincinnati.....	Grain in elevators.	72 hours.	Unloading.
Cleveland.....	Grain.	48 hours.	Milling in transit.
Colorado.....	Grain.	48 hours.	Milling in transit.
	Ore and concentrates.	48 hours.	Sampling en route.
	Coal, coke, lime rock ore and concentrates.	120 hours.	Unloading.
	All freight at interior points to be teamed.	190 to 360 hours.	Loading and unloading.
Columbus.....	Grain.	48 hours.	Milling in transit.
East Tennessee.....	Grain.	48 hours.	Milling in transit.
Illinois and Iowa.....	Sand, Springfield, Ill.	120 hours.	Disposition.
	Coal, Peoria, Ill.	48 hours.	Disposition.
	Coal, Marshalltown, Ia.	96 hours.	Disposition.
	Cedar Rapids, Ia., Freeport, Ill., Dubuque, Ia.		
	Anthracite coal, Rankin, Ill., and Quincy, Ill.	120 hours.	Disposition.
	Coal, Wilkeson, Ill., Galena Junction, Ia., and Oelwein, Ia.	72 hours.	Disposition.
Indiana.....	Grain.	48 hours.	Milling in transit.
Intermountain.....	Ore.	48 hours.	Reconsignment, including time for sampling.
Louisville.....	Ore.	96 hours.	Unloading.
	All freight.	48 hours.	Reconsignment.
Memphis.....	Grain.	48 hours.	Milling in transit.
Michigan.....	Coal, coke, charcoal.	72 hours.	Unloading.
	Coal.	120 hours.	Loading at mines.
	Coal at coking ovens.	96 hours.	Unloading.
	Coal at mines.	120 hours.	Loading, weighing and billing.
	Grain.	120 hours.	Unloading from team tracks at Grand Rapids.
	Lumber.	72 hours.	Unloading.
	Lumber, cargo and light-erage.	120 hours.	Unloading.
	Logs when teamed from cars.	72 hours.	Unloading.
	Dressed lumber.	96 hours.	Loading.
	Furniture by various consignees.	96 hours.	Loading.
	Potatoes in special cars.	72 hours.	Loading.
	Coal for fueling transient vessels.	360 hours.	Unloading.
	Tan bark.	72 hours.	Unloading.
	All freight.	48 hours.	Reconsignment.
Missabe Range.....	Bituminous coal, bulk lime, fruit or vegetables and lumber.	72 hours.	Unloading.
Missouri Valley.....	Coal, coke, bulk lime, ore for smelting.	72 hours.	Unloading by C. G. W. Ry.
	Coal.	72 hours.	Reconsignment by C. G. W. Ry.
Montana.....	Stulls, lagging, coal, coke, lumber, lime, lime rock and bulk precipitate.	72 hours.	Unloading.
Nashville.....	All freight.	48 hours.	Milling in transit.
New England R.R.s.....	All freight.	96 hours.	Loading and unloading. No allowance for reconsigning; this is deducted from 96 hours loading and unloading.
New York and New Jersey.....	All freight.	48 hours.	Reconsignment at duly authorized points.
	Grain.	72 hours.	For track delivery in New York Harbor.
North Carolina.....	Grain.	48 hours.	Milling in transit.
Northeastern Pennsylvania.....	All freight.	48 hours.	Reconsignment at duly authorized points.
Northern.....	Soft coal in Twin City Terminals.	72 hours.	Reconsignment.
Pacific Northwest.....	Lumber.	72 hours.	Unloading.
Philadelphia.....	Various.	72 hours.	Unloading at few points.
Pittsburgh (Territory in Ohio).....	All freight.	48 hours.	Reconsignment.
Pittsburgh.....	Grain.	48 hours.	Milling in transit.
Southeastern.....	Grain.	48 hours.	Milling in transit.
Southern.....	Coal, coke, bulk meat, fresh fruit and vegetables at New Orleans.	72 hours.	Unloading.
Texas.....	All freight.	48 hours.	Reconsignment.
	Coal and coke.	72 hours.	Unloading.
	Cotton at interior companies.	72 hours.	Unloading.
	Lumber 80,000 lbs. weight or more, in covered cars.	72 hours.	Unloading.
	All freight.	96 hours.	Loading and unloading when consignor or consignee is located more than five miles from the railroad station.
Toledo.....	Grain.	48 hours.	Milling in transit.
Virginia and West Virginia.....	Grain.	48 hours.	Milling in transit.
Western.....	Coal.	48 hours.	Reconsignment at specified points.
Western New York.....	All freight.	48 hours.	Reconsignment at duly authorized points.

Free Time Allowed by State Laws and State Commissions.
(When over 48 hours for loading or unloading or 24 hours for reconsignment.)

STATE.	COMMODITY.	TIME ALLOWED—ACCOUNT.
Alabama.....	Fertilizer, hay, coal, coke, brick and lumber in covered cars, bulk meat, potatoes, grain products, cotton seed, cotton seed meal and cotton seed hulls. All freight.	72 hours for unloading.
Arkansas.....	Fertilizer, hay, coal, coke, brick and lumber in covered cars, and the following in bulk: meat, potatoes, grain and grain products, cotton seed and cotton seed hulls. All freight.	96 to 144 hours for loading or unloading when consignor or consignee lives three miles or more from station. 72 hours for unloading.
Connecticut.....	All freight.	130 hours if consignee or consignor lives five miles or more from station.
Florida.....	Seed cotton cotton seed in bulk, cotton seed hulls in bulk, coal, bulk potatoes, fertilizer material in bulk, bulk cabbage, brick, dressed lumber in box cars. All freight.	96 hours loading or unloading. 72 hours for unloading. 96 hours for unloading.
Georgia.....	Coal in cars containing 60,000 lbs. or over and sides 3 1/2 feet high or over. All freight.	Additional time allowed if consignee lives more than four miles from station. 60 hours unloading.
Kansas.....	Coal, coke, bulk meat and all fresh fruit and vegetables, New Orleans. Long material, requiring two or more cars. All freight.	72 hours on cars over 60,000 lbs. capacity. 48 hours reconsigning. 72 hours unloading.
Louisiana.....	Coal, coke, bulk meat and all fresh fruit and vegetables, New Orleans. Long material, requiring two or more cars. All freight.	72 hours loading and unloading.
Minnesota.....	Coal, bulk lime, fruit, vegetables and lumber. All freight.	Additional free time from 130 to 168 hours allowed when consignee lives distance from station. 72 hours unloading.
Mississippi.....	All freight.	190 hours when consignee lives over three miles from station, and 168 hours when over ten miles.
Missouri.....	All freight.	72 hours loading or unloading cars of 60,000 lbs. or greater capacity. 72 hours unloading.
Montana.....	Lumber, stulls, lagging, coal, coke, wood, lime, lime rock and bulk precipitates. All freight.	72 hours loading and unloading. 72 hours unloading.
New Jersey.....	Fertilizer, brick, and following in bulk: cotton seed, cotton seed hulls, coal, coke, fertilizer material, grain, lime, tan bark and dressed lumber in box cars. All freight.	72 hours loading and unloading. 72 hours unloading.
North Carolina.....	All freight.	Consignees residing more than five miles from station to be allowed a maximum of 120 hours. 72 hours unloading cars containing over 60,000 lbs. 72 hours unloading.
Ohio.....	All freight.	Additional time allowed to consignees living four miles or more from station. Same as Texas Car Demurrage Bureau.
South Carolina.....	Grain, flour, meal, bran, mill feed, cotton seed, cotton seed hulls, cotton seed meal, fertilizer, fertilizer material, hay, coal, pyrites, bulk apples, potatoes and cabbage, dressed lumber (in box cars), brick and crushed stone. All freight.	96 hours loading and unloading. 72 hours unloading.
Texas.....	All freight.	72 hours unloading.
Vermont.....	Fertilizer, hay, coal, coke, brick and lumber in covered cars.	120 hours as maximum to parties living five miles or more from station.
Virginia.....	Meat, potatoes, grain, grain products, cotton seed, cotton seed hulls in bulk, glass bottles. All freight.	

[It will be noticed that these irregularities are numerous and varied. For example, in Colorado a period of from five to 15 days is allowed for loading and unloading freight which has to be teamed. At certain coal mines in Michigan, a period of five days is allowed for loading, weighing and billing. The four days' free time required by law in Connecticut and Vermont appears to be general throughout New England. At New Orleans 72 hours is allowed for unloading fresh fruit and vegetables. This appears to be a state regulation—designed by the legislature, no doubt, to aid the down-trodden consignee in preserving the freshness of his fruit and vegetables.]

Interchange of Cars.

Your committee has continued its investigation into the method of car interchange and inspection at large centers, one a transportation matter, the other mechanical. These two questions are both important, but have heretofore been considered by both departments of the railways from entirely different standpoints. Local committees have been appointed to investigate the methods pursued in both cases, with the result that it had been found that the work is largely duplicated. The transportation department wants all information received by the mechanical department, except the information as to repairs necessary, and the mechanical department wants all the information needed by the transportation department except car seals, and probably only 30 per cent. of cars interchanged move under seals. At some points joint committees of transportation and mechanical officials are endeavoring to work out a combination plan to save the duplications of work, improve the records and save expense. Your committee has been endeavoring to reconcile the differences which exist between the two departments, arising from long continued independent operation.

The monthly per diem reports frequently omit a considerable number of the foreign cars handled. These cars must be traced to determine the number of days due. Even these

reports are subject to disputes, on account of inaccuracy and many per diem reports for many years back are still open. Progress has been made in correcting these evils, at St. Louis particularly, where the records of the mechanical department have been utilized in checking the interchange reports. The idea of settling per diem by balance rather than by individual cars has of late had many strong advocates. Discrepancies in seal reports give rise to much difficulty in locating responsibility for claims, some roads taking their record in the breaking-up yard rather than at actual point of interchange. * * * At many points understanding as to the interpretation of the M. C. B. rules has been agreed upon and supervision has been installed to insure their uniform application. There are still some places where the practice of rejecting cars with defective safety appliances still exists. Where this practice has not been corrected, the trouble is usually traceable to two things: First. Lack of repair material. Second. Misconception on the part of the inspector as to the effect his attitude has upon the transportation business. The experiment has been tried by some railroads of having the inspectors represent both the mechanical and transportation departments with very beneficial results, as a broader view is taken of the necessities.

The plan in effect at Denver, where the two departments cooperate, is well known. An agreement is now proposed at Omaha [the committee presents a copy of it]. In this proposed agreement provision is made for supervision by the Omaha division of the Central Association of Railroad Officers, and the governing committee is to consist of one officer of the transportation department and two of the mechanical. These men are to be appointed by the president of the Omaha division of the association, and will select their own chairman. The chief inspector shall appoint the necessary assistants. Where two or more inspectors are on duty together, one of them must be made inspector-in-charge. The inspectors inspect for mechanical defects and take all necessary records for interchange reports, for icing, for ventilation and for seal records. It is proposed to have the joint bureau take charge of joint yard clerk work where the lines interested so desire. No company shall withdraw from the agreement except on 90 days' notice.

FOREIGN RAILWAY NOTES.

The Prussian State Railways pay rewards to the men who serve them longest. Recently they paid:

20 marks to	2,814	men who had served	20 years.
30 " "	2,030	" " " "	25 " "
40 " "	1,174	" " " "	30 " "
60 " "	1,254	" " " "	35 " "
80 " "	381	" " " "	40 " "
100 " "	99	" " " "	45 " "
150 " "	34	" " " "	50 " "

Altogether 284,860 marks, or \$67,797.

A consular report says that work on the Pukow-Tientsin Railway was formally opened on January 3. It is to be finished between Tientsin and Pukow, which is near Nanking, within three years. A British and German syndicate is furnishing the money for the construction of the railway in the form of a loan guaranteed by the Chinese government.

In Switzerland the acquisition of the Gotthard Railroad by the state encounters some difficulties; not to speak of the rights of Germany and Italy, which contributed large sums to the enterprise, there is the pay of the employees, which is higher than on other Swiss railways, while the laws provide one and the same salary for men of the same grade.

The employees of the Belgian State Railways have claimed the right to combine in one organization. Railroad Minister Helleputte has brought in a bill securing them that right, but forbidding under severe penalties their participation in a strike.

ENGLISH RAILWAYS.

BY WILLIAM WICKHAM TURLAY.

IV.

BAGGAGE.

As cab fares in England are low, the rate in London, for instance, being one shilling (24 cents) for the first two miles or fraction thereof, and sixpence (12 cents) for each additional mile, with twopence (4 cents) extra for each piece of baggage, an English traveler having baggage drives to or from the station and keeps his baggage with him. At the station the large pieces, if any, are labeled with the name of the station for which they are destined, and placed in one of several baggage compartments in the train, usually in the one nearest the car occupied by the owner, who, on reaching his destination, claims his baggage, which he finds on the platform, a porter being at hand to call a cab and place the baggage on it. This system makes it necessary for the traveler to claim his baggage promptly on arriving at his destination or run the risk of having it claimed by thieves who are on the watch for such opportunities,* and he cannot readily change his stopping place after he has begun his journey. On the other hand, he is saved the annoyance and delay, as well as the expense, which the American methods impose upon anyone who travels with baggage beyond a hand-bag, and there is no accumulation of unclaimed baggage at stations. If one wishes it, the railways will collect baggage at the traveler's residence or hotel, take it to the station in their own wagons, and deliver it again at residence or hotel at destination, for an inclusive charge of one shilling (24 cents) per piece; this avoids risk of loss, but involves some delay. There seems to be no valid reason why the English railways should not adopt a system of checking baggage—either the American one, or better yet, the Continental one, involving the use of books of labels consecutively numbered in triplicate, one being given to the passenger as a receipt, one pasted on the piece of baggage, and the third, or stub, remaining in the book as a record.

It may be proper to say that nowhere in England does baggage undergo the outrageously rough and careless handling which it too often receives in America at the hands of the employes of railway and transfer companies.

TRACKS AND TRAINS.

English railway tracks differ from those in America mainly in the fact that the rails are of a different shape, and instead of being held in place by spikes driven into the wooden cross-ties, rest in heavy iron castings called chairs, two of which are securely screwed or bolted to each cross-tie. This prevents spreading of the rails and diminishes the evil effects of broken rails, two sources of many serious accidents on American railways. In general the tracks are very good and the cars well built. The writer has eaten a meal in the dining car of a train which was scheduled to run 113 miles in exactly two hours, without a stop, or 56½ miles to the hour, doing this to the minute, and so smoothly that water was not splashed out of a full glass on the table.

The number of very fast trains running regularly on English railways, and the total number of passenger trains, both fast and slow, being so much greater than in America, in proportion to mileage of tracks, no fair comparison can be made. It must be remembered that the population is more dense in England than in any but a very few parts of America, and that the relative amount of freight and passenger traffic in the two countries is almost reversed. We must rest our claims for high speed on a few trains running between New York and Chicago and New York and Buffalo, for distances greater than are covered in England, and on a somewhat larger number of trains running for shorter distances between Boston, New York, Philadelphia and Atlantic City.

*Actual claims from these losses are negligible.—EDITOR.

ELECTRIC LINES.

As in America, some of the English roads which do a large suburban business have changed their motive power from steam to electricity on a portion of their lines, notably in and around London, where some lines are used jointly by steam and electric trains of different companies. Such a change has also been made on lines running out of Liverpool and Newcastle-on-Tyne.

OMINIBUS LINES.

Automobile omnibuses, owned and operated by the railway companies, are largely used as "feeders." Many small country towns, lying away from the railways, and to which it would not be practicable or economical to extend the latter, are thus given a regular service to the nearest station throughout the year. In other cases the 'bus lines are maintained only during the summer months to enable tourists to ride through picturesque parts of the country, or to reach villages remote from the railways, and to which there is ordinarily little travel. In either case such lines create business for the railways.

Omnibuses, operated by horses or by motors, are also maintained in some of the large cities for carrying through passengers across town from one station to another, or from a station to a steamboat dock.

THROUGH CARS.

A great many through cars are run to places which are not on the line or division of the road over which the rest of the train goes on to its destination, these through cars being switched off at junction points and attached to trains which run over other branches of the same road, and sometimes even over the lines of other, and competing roads. This gives direct service by the shortest available route, and is a great convenience, as the through cars contain compartments of each of the several classes, and the service is given not only for long distances, but for comparatively short ones also, while in America the traveler finds few through cars except Pullmans, and even these are seldom available for comparatively short journeys over two or more lines. Our American railways often compel a passenger to travel a longer distance over their own lines, even when a short route might be available, attaining their object not only by their failure to provide a joint through service by the shorter route, but by so arranging their time tables that a passenger cannot connect at the junction point with trains of the other line without great delay and loss of time.

SUBURBAN SERVICE.

The English railways entering the larger cities, and especially London, must handle, in addition to their long distance main line trains, an immense number of suburban trains, running over an intricate network of short lines, extending to various suburban regions, and the complication is increased by the fact that in order to accommodate the commuters trains must be run from each of these branch lines, not merely to and from one terminal station in the city, but to and from two or three different terminal stations maintained by the company itself, and also to and from several other city terminals of other companies, whose lines and stations as well as those of the local London District Railway are used in common for this service by agreement. A commuter may thus choose the one of a number of terminal stations which is nearest to his place of business, and is saved from considerable loss of time, but the complicated problems involved, and the congestion of traffic at some of the junctions and terminals, are unequalled at the most important terminal stations in America, and the safe and prompt hauling of this enormous traffic, especially during the foggy weather so common around London from fall to spring, does great honor to all concerned in it.

(To be continued.)

General News Section.

Governor Hughes of New York has approved a bill passed by the legislature appropriating \$5,000,000 for the construction of "good roads" at the expense of the state.

The Boston & Maine is to restore the pay of those officers and employees who, on February 14, 1908, accepted a reduction of 10 per cent. The order affects about 400 men, all of whom formerly received \$100 a month or more.

Governor Hughes of New York has approved a bill providing for a commission to investigate the question of providing terminal facilities for the canals of the state—which means the provision of docks and harbor facilities at New York City and other places.

The Canadian Railway Commission has extended the time within which railways shall equip their passenger cars with fire extinguishers as follows: In cars under construction or in shops undergoing repairs within six months from May 4, 1909; cars at present in use within 18 months from Nov. 3, 1908.

At St. Louis, May 20, four railways were fined a total of \$9,700 for violating the law providing that cattle shall be taken from cars at least once in every 28 hours and fed and watered. The companies fined were the St. Louis, Iron Mountain & Southern, the Terminal Railroad Association, the Wabash and the Missouri Pacific. They pleaded guilty.

On Thursday, May 20, the Cunard steamship *Mauretania*, which had left Liverpool on Saturday evening, May 15, arrived at the quarantine station, New York harbor, at 11:10 p. m., and the mails from the vessel reached the New York post-office about 3:30 on the morning of Friday. Most of the mail for western states was, therefore, sent out from New York on the early morning trains.

The Post-office department at Washington is planning to send first-class mail from New York to Seattle in 96 hours. This is made possible by the new through train which has been put on by the Chicago, Burlington & Quincy and the Northern Pacific, which leaves Chicago at 9.20 a. m., 25 minutes after the arrival of the 18-hour train from New York over the Pennsylvania Lines. Letters leaving New York at 3.55 p. m. on Monday would thus be due in Seattle at 12.30 p. m. on Friday.

The New York State Public Service Commission, Second District, reports for the month of March that 92 per cent. of the passenger trains run in the state reached their division termini on time. The commission has now kept these records 12 months, and the percentage now reported is the highest yet. For the entire year the number of trains reported was 650,592, of which 83 5/6 per cent. were on time. For March the Erie, the Boston & Albany and the Northern Central each reported 96 per cent. on time.

The plans of the New York, New Haven & Hartford for the extension of electrification include both the Harlem River branch and the main line from Stamford to New Haven. At New Haven the plans include the electrification of all four tracks in the cut there and of the Cedar Hill freight yard. It is believed that when the work is begun it can be completed in about 18 months, and it is now given out that it may be started at an early date.

The State Board of Health of Montana has issued rules governing the sanitation of railway trains and other public conveyances. Persons having any contagious disease are prohibited from entering a train, and if a conductor suspects that any person on his train has a disease which makes his presence unlawful he must notify the nearest health officer or competent physician, who must meet the train and examine the suspected person. If the health officer shall find that persons on any car have been exposed to smallpox, he shall cause the car to be removed from the train. Expectoration in cars or railway stations, except in spittoons, is prohibited, and railways are required to post notices to this effect and to place

spittoons on the floors in waiting rooms of stations and in offices used by railway officers and employees. Each sleeping car run in Montana must be supplied with one spittoon for each section or compartment. Each smoking compartment in a day coach, chair, parlor or sleeping car must be furnished with at least two spittoons. Each smoking car must be provided with at least 12 spittoons, and each combination smoking car with at least 8 spittoons. Dry sweeping and dusting of the cars while in transit is prohibited. The floors of all cars must be cleaned with soap and water at the end of each trip, after which the floors must be mopped with a 1 per cent. solution of the formaldehyde solution prescribed by the United States pharmacopoeia or with some other disinfectant approved by the Board of Health. Sleeping cars must be fumigated at least once every 2 months and for this detailed rules are given. Porters shall not be allowed to sleep in sleeping cars in Montana unless a special compartment and special bedding are provided for them. Detailed rules are also prescribed for the sanitation of stations and appurtenant buildings.

The Consolidated Express Company.

Incorporation papers have been filed with the Secretary of State of Connecticut for an express company with the above name and with a capital stock of \$1,000,000 (\$500,000 paid in), to do express business on the New York, New Haven & Hartford and on the steamers of the companies controlled by the road. This includes the Fall River Line. At present the Adams Express Co. has the contract to do business throughout the New Haven lines. The incorporators of the new company are H. M. Kochersperger and Benjamin Campbell, vice-presidents, and H. S. May, treasurer of the New Haven road.

Kansas City Terminal.

The Board of Directors of the Kansas City Terminal Railway Company, at a meeting in Chicago on May 17, adopted a resolution to the effect that the proposed ordinance providing for the erection of new passenger stations and terminals in Kansas City is acceptable to the Terminal Company, subject to agreement as to certain details, and subject also to the ability of the company to acquire necessary property at reasonable prices. (May 21, p. 1102.) The ordinance will have to be submitted to a vote of the people of Kansas City before it can become effective. The situation in Kansas City was reviewed at length in an editorial in the *Railroad Age Gazette* of October 23. As stated then the principal objections in the way of agreement in regard to the ordinance under which the new passenger stations and new terminals are to be built were differences of opinion between the representatives of the city and the representatives of the railways regarding switching charges and payment by the railways for damages to property. The difference regarding switching charges was settled by the roads indicating that no advance in switching charges would be made, and the city withdrawing the demand that the ordinance should contain a provision perpetually requiring the roads to absorb switching charges. The basis of agreement regarding damage to property was outlined in last week's issue of the *Railroad Age Gazette*, p. 1102.

"Wireless" Demonstration by the Union Pacific.

An interesting demonstration of wireless control of electrical apparatus at a distance was given on May 12 at the electrical show in Omaha, Neb. Dr. Frederick H. Millener, Experimental Electrician of the Union Pacific, turned on the lights in the building by means of an impulse sent from the Fort Omaha wireless tower, six miles away, facilities at the fort having been made available through the courtesy of Colonel Glassford, Signal Corps, U. S. A. The wireless im-

pulse acted on a specially constructed delicate coherer, similar in construction to that used about a year ago on the electrically controlled truck in the shop yards of the Union Pacific, at Omaha, and described in these columns at the time. By the means of a large solenoid switch, which is closed when the impulse passes through the coherer, 75 h.p. was turned on and the auditorium lighted. The power was turned off in the same way, the operation being repeated several times. This demonstration was made in connection with experiments that the Union Pacific is conducting at its shops.

Train Robbery at Omaha.

The Overland Limited Express, eastbound, of the Union Pacific was stopped by four robbers about three miles west of Omaha at 11:45 o'clock on the night of May 22 and seven sacks of valuable registered mail were rifled. The Union Pacific offered a reward of \$5,000 for the capture and conviction of each of the robbers. After the robbers had taken the sacks which they wanted they put them into an automobile and soon disappeared, having detained the train only about 15 minutes.

Standard Code on the I. & G. N.

The International & Great Northern on April 26 adopted the standard code of train rules and, according to the *Galveston News* of May 9, the somewhat radical change from the old rules was carried out without the slightest disturbance. The first two weeks did not develop a single misunderstanding. The new book was compiled by S. E. Burkhead, who was Inspector of Transportation, but who has since been appointed Assistant Superintendent of the Gulf division.

Although the International & Great Northern operates 1,100 miles of road, it has until now continued the old-fashion of having its rules printed on the back of the time-table, which, for the Fort Worth division, is a sheet 22 in. x 29 in.

The new book is well arranged and the amendments to the standard code are not numerous. The standard rules are Nos. 1 to 106 inclusive; train order rules, 201 to 223, inclusive, and interlocking signal rules, 1 to 16, inclusive. Following the standard rules are chapters for trainmasters, train dispatchers, yardmasters and the different classes in the train and station service, and also separate chapters on air-brakes, on courtesy to patrons, on bulletin orders, on employment, promotion, uniforms, hospital regulations, emergency boxes, what to do in case of personal injuries, U. S. mails, Pintsch gas, steam heat, loading and handling cotton, the transportation of explosives and four pages of special rules which have to do with the work of all classes of men in the operating department. The rules for handling cotton are of interest to a northern railway man mainly as a curiosity, as they deal largely with "exposed" cotton, that is to say, cotton carried on platform cars or otherwise exposed to fire. The regulations for the transportation of explosives consist of a six-page condensation of the more elaborate rules prescribed by the Bureau of Explosives. The special chapter on courtesy to patrons is a reprint of that which was published by the Lackawanna a year ago, and which was reprinted in the *Railroad Gazette* of May 29, 1908. The chapter on personal injuries contains the most essential "first aid suggestions" compressed into six paragraphs, occupying only three pages. The headings of these paragraphs are: Wounds; boiled water; fractures; eye; burns, and shock.

We quote some of the principal features of the standard train rules as here given: Rule 10 prescribes red for stop, green for proceed, yellow for caution. Rule 89 requires conductors to signal enginemen on approaching a meeting station. Rule 90-a requires all except first-class trains and following sections of all trains, including first-class, to approach time-table, coal and water stations under control (the comma after "time-table" would seem to leave very few exceptions to this rule).

The time interval in rule 91 is 10 minutes. A section of a passenger train which does not make the schedule stops must pass the platforms of stations at reduced speed. Under rule 93 the main track may be used within yard limits by protecting against first-class trains. Rule 99-c reads: "An ob-

struction of the main line must be protected by flagman when necessary to prevent accident." Rule 104 has eight supplementary paragraphs. In approaching switches enginemen must "when practicable" regulate speed so as to be able to stop if the switch is wrong.

A New Kind of Train Accident.

At Far Rockaway, N. Y., one day last week, the engineman of a locomotive of the Long Island Railroad, just starting from the station, was knocked out of his cab by an electric current which came through the roof of the locomotive cab from an overhead trolley wire which had become displaced. The wire was broken by coming in contact with the cab, and the ends, falling on the roof of the baggage car, communicated through the gas pipe to the tanks beneath the car and ignited the gas therein. The cars at once took fire from the flames, and the passengers—100 or more—were alarmed and fell into a panic. Some of them were trampled on in the mad rush to escape from the cars. There was also a live third rail at the point and one of the passengers was shocked by coming in contact with that. It was about ten minutes before anyone was able to get the power current turned off.

F. D. Underwood on the Business Situation.

President Underwood, of the Erie, gave the following characteristic statement to the *Milwaukee Wisconsin* while in Milwaukee on May 15:

"The country at large is entering upon an era of prosperity, say the wise men, and they know; not so fast a speed as heretofore, but a good family horse, safe gait.

"The public has awakened and is awakening to the fact that baiting corporations 'does not pay,' and in the end pay is what we all want.

"Not that the dollar is the only thing, but just before you get the other desirable things you need the dollar.

"Reform is a great thing—overworked of late—and now due for a quiet summer rest."



All That Is Left.

—Boston Herald.

Street Railway Training School.

A street railway training school is to be established by the Metropolitan Street Railway Company, New York City, open to college and scientific school graduates, for the purpose of educating officers for the company. The pupils will be paid living wages while taking the two-year course.

The difficulty of obtaining high-class men who are willing to begin at the bottom and learn the street railway business led Mr. Root, the general manager, to try the experiment. The prospectus of the school and application blanks have been sent to the presidents of nineteen colleges and scientific schools as follows: Amherst College, Brown University, Cornell University, Cambridge Manual Training School, Dartmouth College, Hamilton College, Massachusetts Institute of Technology, Purdue University, Brooklyn Polytechnic Institute, Pratt Institute, Rensselaer Polytechnic Institute, Stevens Institute of Technology, Syracuse University, Tufts College, Union College, Wesleyan University, Sheffield Scientific School, Worcester Polytechnic Institute and Williams College. Mr. Root hopes to get young men who have had some technical training and who have an inclination to enter upon work of this character.

The course will be two years. During the first year the student will be paid \$15 a week. The second year man will receive \$20 a week. The pupil will be assigned to duty in the maintenance of way, the electrical, the equipment and the transportation departments, spending three months in each department.

In the first he will do field work in connection with renewal of rails, installing tracks, surveying, etc., and will study designing and construction of buildings, efficient handling of men, laying of pavements, car-house construction, etc. In the electrical department he will familiarize himself with the conduit and feeder system, the location and character of the cables by which power is transmitted from the power station to the cars on the streets and electrical and steam engineering. In the car barns and repair shops he will study maintenance of car equipment under operating conditions, rewinding of armatures, repairing of commutators, blacksmithing, lathe turning and metal work in general.

In the transportation department he will learn to run a car and act as conductor and motorman for a short period. Then he will have a thorough course in the details of regulating the service under normal and emergency conditions. He will also learn routine work in the division offices, such as time-keeping, checking up the cash received from conductors, making up of accident and other reports, etc. Applications are to be sent to F. T. Wood, No. 621 Broadway.

Extension of the Texas State Railroad.

The Texas legislature at its recent session passed a bill providing for the extension of the Texas State Railroad from Rusk to Palestine. This road is operated mainly to handle traffic between the various industries conducted as a part of the state penitentiary system at and near Rusk. The road now runs from Rusk to Gill, a distance of 24 miles, and connects with the St. Louis Southwestern at State Crossing and at Rusk. The extension will be about 10 miles long and will connect with the International & Great Northern at Palestine.

The bill passed provides for an issue of \$200,000 5 per cent. bonds secured on the property of the company. The Comptroller of Public Accounts and the State Board of Education are required to buy the bonds from the penitentiary board and pay for them out of the permanent state school fund at their face value, the principal of the bonds to constitute and remain a part of the permanent school fund.

About \$150,000 is to be used to redeem bonds previously issued and the remainder of the money realized from the securities is to be applied to the completion of the road. When the railway is completed to Palestine it shall be the duty of the penitentiary board to try to sell it. The board is authorized at its discretion to make application to the State Railway Commission to value the railway property, and in no event shall it be sold for less than such valuation.

This indicates that the state of Texas is not disposed to embark extensively in the construction and management of railways, and this is further indicated by the refusal of the

legislature to pass another bill which contemplated the construction of 100 miles of railway in addition to the extension from Rusk to Palestine. For the purpose of enabling the state to build the additional 100 miles, the bill provided that the state should issue 5 per cent. bonds which should be bought out of the permanent school fund at their face value. After a hot fight this bill was defeated by a large majority.

Grand Trunk Pacific Shops and Yards.

The shops and yards at Winnipeg, Man., contract for which was recently awarded to Haney, Quinlan & Robertson, of Toronto, Ont., consist of a locomotive, machine and erecting shop, 170 ft. x 612 ft., provided with 25 pits; a boiler and tank shop, 185 ft. x 210 ft.; a power house, 110 ft. x 150 ft.; an iron foundry, 130 ft. x 200 ft. with cleaning room, 48 ft. x 80 ft.; a carpenter and pattern shop, 70 ft. x 100 ft.; a store-room, 60 ft. x 260 ft.; an oil house, 40 ft. x 60 ft., with store platform, 60 ft. x 120 ft.; a forge shop, 100 ft. x 260 ft.; stores and scrap shop, 40 ft. x 220 ft.; an oil house, 20 ft. x 60 ft.; and a frog and track shop, 60 ft. x 100 ft.

The layout of the yards provides for a second track along the main line, and the freight sheds and tracks for team delivery are situated between Springfield Road and the main line. The eastbound receiving and classification yard is located on the other side of the main line and beyond is the westbound lead with tracks for repairs and other purposes. Further on are the track scales, ice-house, wrecking outfit tracks, etc., and the tracks leading to the roundhouse, coaling trestles, etc. The roundhouse will accommodate 37 locomotives, and has a 75-ft. turntable.

Where New Coins Are Common.

J. C. Lawrence, one of the railway commissioners of the state of Washington, after an inspection of the Idaho & Washington, declares that it is a model railway. "Its grades and curves are perfect. Its cars are the latest and best product of the Pullman shops. Each car carries a dynamo and storage batteries that light it with electricity while it is running, and for eight hours afterward. The engines are the latest models and shine like new coins."—*Exchange*.

Railway Men's Day at the Alaska-Yukon-Pacific Exposition.

The Alaska-Yukon-Pacific Railway Men's Day Association has been organized by the railway men of Seattle, Wash., to further the success of Railway Men's Day at the exposition, which will be Saturday, July 3, 1909. The following are the officers of the Railway Men's Day Association: President, F. W. Parker; Vice-Presidents, R. Dudgeon and A. E. Campbell; Secretary, F. R. Hanlon. The program on Railway Men's Day will consist largely of features illustrative of the development of the art of transportation.

Carloads and Gradients on the Bessemer & Lake Erie.

In 1908, on the Bessemer & Lake Erie, the average number of tons of revenue freight per train was 931, and the average trainload southbound was 1,345 tons. Yet the Bessemer & Lake Erie is by no means a water level line. The only piece of level track in the 142 miles between Conneaut harbor, on Lake Erie, and North Bessemer, is a 10-mile stretch between Conneaut Junction and Springboro. The total lift southbound is 1,745 ft. and this is in the direction of maximum traffic. There is one grade southbound of 68 ft. to the mile and 37 per cent. of the entire line is on curve.

P. R. R. Pensions.

The number of employees of the Pennsylvania Railroad receiving pensions from the company on Jan. 1, 1909, was over 2,000, and the payments to them during the year 1908 amounted to \$544,245. Since the Pension Department was established in 1900 the sum of \$3,445,794 has been paid to retired employees. When the pension system was inaugurated the sum of \$300,000 was appropriated for the first year's

payments; in 1902 this was increased to \$390,000 and in 1907 to \$600,000. This does not include the operating expenses of the department, which in 1908 amounted to \$5,369. A total of 367 employees were retired on pensions in 1908, while 211 men who were already on the pension list died during the year. The number of retired employees on December 31, 1908, was 2,176. The average age of those receiving pensions is 73 years and 3 months, while the oldest employee on the list attained the age of 92 years in 1908.

Railway Signal Association.

The subjects that will come up for discussion at the New York meeting, which is to be held on June 8 at the Engineering Societies building, West Thirty-ninth street, New York, are The Semaphore Signal—Upper Left-hand Quadrant versus Upper Right-hand Quadrant, by C. H. Morrison (N. Y., N. H. & H.), and The Use of Alternating Current in Signaling, by W. K. Howe (General Railway Signal Co.), Rochester, N. Y.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
 AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, O.; June 22-25; Albany, N. Y.
 AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—R. E. Wilson, Ry. Exchange, Chicago.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 29-July 3; Atlantic City.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St.; N. Y.; 1st and 3d Wed., except July and August; New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June, 1910; Colorado Sp'gs.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May 26-28, 1909; Detroit, Mich.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago, June 23-25, 1909; Detroit.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Coard, 24 Park Pl., New York; June 22-23; Montreal.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago, June 21-23, 1909; Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago; June 1-5; Chicago.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; June 8, New York.
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago; Sept. 7-8; Fort William Henry, Lake George, N. Y.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
 SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R., East Buffalo, N. Y.; September, 1909; Denver.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St.; Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago, 1st Wednesday, except July and August; Chicago.

Traffic News.

The Canadian Railway Commission has ordered that Grand Trunk and Canadian Pacific railways honor from the international boundary through tickets issued by initial United States railways to non-competitive points on the Canadian Northern. This order was granted at the instance of the Keystone Camping Club of Pittsburgh, Pa.

The Interstate Commerce Committee of the Spokane Chamber of Commerce has adopted resolutions favoring the entire rejection by the shipping interests of Spokane of the tariffs of rates which the transcontinental railways have suggested shall be put in effect to Spokane in place of those provided for by the decision of the Interstate Commerce Commission in the Spokane rate case. This move seems to have been taken at the instance of H. M. Stephens, who was the attorney for the city of Spokane in the case before the Commission, and indicates that the business interests of the city will not voluntarily accept any rates which are not as low as, or lower than, those to Pacific Coast points.

Newspaper reports say that unless the Interstate Commerce Commission modifies its decision in the Spokane rate case or unless the plans of the railways to conform to that decision by making the rates to intermediate points in the west on many commodities the same as the rates to the Pacific coast are changed, proceedings will be instituted by the Chambers of Commerce of San Francisco, Portland, Seattle and other Pacific coast cities to compel readjustment of the distributing rates from Pacific coast cities to inland points. Evidence will be introduced, it is stated, to show that rates charged jobbers from Pacific coast points to inland points are much higher than those charged jobbers at inland points on goods shipped to retailers in the surrounding country, and if intermediate cities, such as Spokane and Salt Lake, are to have the same rates as are given to Pacific coast points the jobbers on the coast will be put at a disadvantage compared to those at inland points.

The Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Atchison, Topeka & Santa Fe, the Missouri Pacific and the Wabash filed a petition in the Federal court at Chicago on May 18 for an injunction to restrain the Interstate Commerce Commission from enforcing its order for reduction in class freight rates from Chicago to Denver. It is alleged that the rates fixed by the Commission would give shippers at Chicago an advantage of 25 cents per 100 lbs. and shippers at St. Louis an advantage of 23 cents per 100 lbs. over shippers at the Missouri River in competing for business at Denver, and would therefore unjustly discriminate, and would reduce the earnings of the railways by \$1,000,000 a year and would therefore be confiscatory; also that they would destroy the existing system of basing rates on the Missouri river and therefore cause a disturbance in commercial conditions that would cause heavy loss to many business interests.

Jack Love, Chairman of the Oklahoma Corporation Commission, delivered an address before the Oklahoma State Grain Dealers and Millers' Association in Oklahoma City on May 22, in which he discussed the attitude of the Commission toward the railways. Referring to criticisms of the Commission on the ground that it does not know the facts about railway operation, and, therefore, cannot be just and fair with the roads, Mr. Love said that the roads have refused to answer questions submitted to them with the purpose of securing for the Commission necessary information. For example, an inquiry was made about the cost of the properties of the roads, the details of their cost per mile, and the cost of their equipment per mile. The roads replied that they were unable to give the information because their books did not show it. Their accounting officers had stated that it was not possible to separate the cost of freight from the cost of passenger transportation. If these things were true, said Mr. Love, how could either the Commission or the railway officials know whether certain rates were too high or too low? He said the Commission desires to be fair and just both to the railways and to the people; and the fairness and justness of a rate can best be determined on the basis of cost of serv-

ice; and this can only be ascertained by separating passenger from freight, and interstate from state expenses. He said that if the railways would recognize the honest efforts of the Commission to deal fairly and equitably and would give it the assistance that it needs, there would result an adjustment that would be beneficial to both railways and people.

Russian Coal Shipments.

The rail shipments of coal from the Donetz basin in Russia, by far the greatest mines in the country, amounted to 13,831,147 tons in 1908, which is nearly 3 per cent. more than in the previous year. Less than 18 per cent. was anthracite. The rail shipments were nearly 70 per cent. of the whole amount mined.

Freight Car Balance and Performance, December, 1908.

Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association, in presenting statistical bulletin No. 46, covering car balance and performance for December, 1908, says:

"There was a further increase of surplus cars during the period covered by this report, the daily average being 198,860 cars, or 9.30 per cent. of the total equipment. The shop cars decreased slightly, averaging 7.32 per cent., an "excess" of 2.30 per cent. Combining these, we have a total of 11.60 per cent. to be deducted from the equipment on line in order to continue our comparative summary of performance as below:

	Average miles per day.		Average ton-miles per car per day.		Average earnings per car per day.	
	Inc. surp.	Exc. surp.	Inc. surp.	Exc. surp.	Inc. surp.	Exc. surp.
December, 1907	21.9	23.9	289	316	\$1.98	\$2.17
January, 1908	20.8	24.9	277	325	1.81	2.17
February, 1908	19.7	23.8	271	328	1.82	2.20
March, 1908...	21.2	25.5	290	348	1.95	2.34
April, 1908...	19.6	24.5	258	324	1.83	2.29
May, 1908...	19.3	24.8	254	329	1.72	2.22
June, 1908...	19.6	24.7	276	347	1.88	2.37
July, 1908...	20.0	24.8	275	342	1.84	2.26
August, 1908...	20.8	25.1	292	354	1.98	2.40
Sept., 1908...	22.0	25.2	320	367	2.24	2.57
October, 1908...	23.8	25.9	346	376	2.33	2.54
November, 1908	23.5	25.8	341	375	2.32	2.55
December, 1908	22.3	25.2	332	376	2.16	2.45

"It will be noted that the car mileage and car earnings performance was slightly below the October and November marks, although the ton-miles per car per day held up well. The decrease in loaded movement noted in November continued, the percentage in December being 68.0 per cent. This result was accompanied by an increase in the number of cars at home, which rose from 68 per cent. to 69 per cent. The report shows some improvement in car loading, the average tonnage per loaded car increasing from 21.0 in November to 21.4 in December.

"Although business conditions during December were still considerably below normal, with indications of a further recession, the car performance was much more satisfactory than during the same month of 1907. The conditions as regards car surplus were quite similar during the two periods, the surplus in December, 1907, and December, 1908, equaling 7.89 per cent. and 9.30 per cent. respectively. The averages for this report, especially those that exclude surplus cars, indicate that the roads had adapted their operations to a condition of surplus, and were securing much better service from the cars actually in use than during the earlier months of the depression. The average miles per day (excluding surplus cars) was 25.2 in December, 1908, as against 23.9 in December, 1907; the ton-miles per car per day were 376, as compared with 316 the previous year, and the daily earnings averaged \$2.45 and \$2.17, respectively. In the loaded mileage the difference between 68.0 per cent. and 64.6 per cent. is also in favor of the later period.

"Although these results do not represent the maximum achievement in car performance, they are quite satisfactory for a period in which conditions were so far below normal. As an indication of the possibilities in the way of an increased efficiency of freight equipment, they are very encouraging, as they give rise to the hope that new records may be reached when the car movement is again stimulated by an increased demand for equipment."

The accompanying table shows car balance and performance by groups.

CAR BALANCE AND PERFORMANCE IN DECEMBER, 1908.

	New York, New Jersey, Del., Md., Eastern Pa.	Ohio, Indiana, Mich., Western Pa.	Virginia, W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minnesota.	Montana, Wyo., Neb., Dakotas.	Kansas, Colo., Okla., Ind. T., Mo., Ark.	Texas, Louisiana, N. Mex.	Oregon, Idaho, Nev., Cal., Arizona.	Canadian Lines.	Grand total.
Revenue freight car, owned	73,028	276,507	132,751	172,545	370,345	15,469	134,215	25,904	112,754	100,795	2,067,858
Average number of system cars on line	52,221	201,796	87,928	110,941	285,317	6,227	87,281	13,172	59,414	77,645	1,431,042
Railroad-owned cars: Av. foreign on line	32,306	68,404	35,960	46,603	95,613	11,401	53,893	24,042	44,985	17,289	604,671
Total cars on line	84,527	270,200	123,888	157,544	380,930	17,628	141,174	37,214	104,399	94,934	2,035,713
Excess	11,499				10,585	2,159	6,959	11,310			
Per cent. cars on line of total owned:											
Home	72	73	66	64	77	40	65	51	53	77	69
Foreign	44	25	27	26	26	62	40	93	40	17	29
All railroads	116	98	93	91	103	114	105	144	93	94	98
Private cars on line	3,222	11,769	3,041	6,355	13,419	1,620	7,597	1,963	8,534	4,012	101,911
Total, all cars on line	87,749	281,969	126,929	163,899	394,349	19,248	148,771	39,177	112,933	98,946	2,137,624
Per cent. of cars in shop	6,09	7,76	8,61	10,88	4,75	4,58	12,81	5,32	5,29	9,08	7,32
No. of freight engines owned	1,118	3,753	2,215	2,554	6,298	440	2,481	697	2,834	2,112	33,858
Av. cars on line per freight engine owned	78	75	57	64	63	43	60	56	48	47	63
Total freight-car mileage	42,721,281	165,828,643	87,344,944	115,725,555	254,805,356	23,890,722	85,611,528	31,898,627	101,475,941	83,631,446	1,469,656,744
Average mileage per car per day	15.7	19.0	22.2	22.8	21.0	40.0	19.3	26.2	29.0	27.4	22.3
Per cent. loaded mileage	69.8	64.3	67.0	69.9	72.8	73.2	69.0	63.8	74.4	71.7	68.0
Ton-miles of freight, Inc. Co. freight	427,015,069	2,314,749,899	1,178,230,761	1,665,762,293	2,357,327,653	369,474,447	1,205,839,346	382,490,268	1,535,675,542	1,186,100,281	19,830,620,854
Average ton-miles, including Co. freight:											
Per car-mile	10.0	14.8	13.5	14.4	14.5	15.9	14.1	12.0	15.1	14.1	14.5
Per loaded car-mile	14.3	23.0	20.1	18.5	20.5	21.7	20.5	18.2	20.3	19.7	21.4
Per car per day	157	312	299	340	328	694	273	315	440	387	332
Gross freight earnings	\$4,860,166	\$13,391,355	\$8,233,956	\$10,981,471	\$19,167,703	\$2,901,929	\$10,422,240	\$3,686,060	\$13,868,756	\$7,137,315	\$136,625,138
Average daily earnings: Per car owned	\$2.15	\$1.56	\$2.00	\$2.07	\$2.19	\$6.05	\$2.51	\$4.59	\$3.98	\$2.28	\$2.23
Per railroad-owned car on line	1.85	1.60	2.14	2.26	2.19	5.31	2.39	3.19	4.30	2.43	2.28
All cars on line	1.79	1.53	2.09	2.17	2.10	4.86	2.27	3.04	3.97	2.33	2.16

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF MARCH, 1909.

(See also issues of May 7, 14, and 21.)

Mileage operated at end of period.	Name of road.	Operating revenues			Maintenance of way and structures, equipment.			Trans- portation.	General.	Total.	Net operating revenues (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) last year.
		Freight.	Passenger.	Total.	Inc. misc.	Of structures, equipment.	Traffic.								
309	Alabama Great Southern	\$196,086	\$59,131	\$285,049	\$30,137	\$43,610	\$8,040	\$92,261	\$10,553	\$184,601	\$100,448	\$412*	\$11,778	\$88,258	\$47,009
237	Atlanta & Birmingham Air Line	64,818	17,350	86,529	30,343	9,687	939	30,343	1,192	51,596	34,933	.....	4,813	30,120	30,343
388	Central Branch	113,871	26,344	149,122	18,191	23,344	3,888	56,453	3,829	105,205	43,917	.....	9,500	34,417	10,246
285	Chicago, Cincinnati & Louisville	89,164	19,744	108,908	15,894	24,985	3,865	57,211	5,675	112,130	1,810	.....	3,330	1,520†	12,664
818	Chicago Great Western	531,735	130,472	713,510	69,175	177,965	37,634	323,681	33,394	641,849	71,861	1,537	18,385	54,813	37,656
329	Chicago, Indiana & Southern	214,599	17,955	242,554	24,665	47,698	8,002	98,002	6,103	185,244	55,519	124*	12,500	42,895	17,726
255	Chicago, Peoria & St. Louis	106,348	23,444	135,746	16,270	30,991	6,067	61,312	4,978	119,618	16,128	.....	4,150	11,978	14,117
210	Cleveland, Akron & Columbus	115,530	32,269	147,798	24,454	39,360	1,933	51,969	2,828	166,508	16,929	.....	5,006	35,936	867
194	Cleveland, Lorain & Wheeling	160,873	16,406	183,137	32,765	46,262	6,177	80,177	6,258	166,508	16,929	2,842*	9,406	7,223	194,544
282	Duluth, Missabe & Northern	80,137	33,063	117,191	59,673	46,262	1,728	57,492	12,112	177,267	101,960	.....	9,319	92,868	20,182
454	Fort Worth & Denver City	249,715	123,380	390,791	61,329	63,653	6,368	144,135	13,046	288,831	101,960	.....	1,900	32,409	34,304
196	Fort Worth & Rio Grande	58,881	28,050	86,931	13,307	19,374	3,614	36,214	8,191	59,695	34,309	.....	1,122	54,854	1,176
307	Georgia	181,878	54,479	250,598	27,760	47,633	8,810	103,689	6,730	194,652	55,976	.....	1,000	57,469	31,420
395	Georgia Southern & Florida	119,956	49,824	191,905	14,533	28,684	5,773	71,112	8,058	128,032	63,943	1,584	8,058	92,868	20,182
336	Grand Trunk Western	338,360	105,293	478,019	24,665	72,621	20,172	204,830	12,355	334,543	143,476	1,964*	32,000	109,512	135,378
191	Houston, East & West Texas	73,730	22,584	102,419	16,177	10,092	984	35,459	2,418	66,172	36,247	.....	8,408	81,439	7,241
386	Kansas City & Fort Dodge	120,714	51,639	164,138	14,526	29,840	1,612	72,402	2,712	116,156	44,982	1,405	8,937	37,450	12,611
324	Kansas City & Fort Dodge	43,565	22,328	71,238	17,526	16,612	2,421	55,167	5,189	66,445	4,793	.....	8,000	3,207†	119,344
3,492	Midland Valley	1,361,550	208,987	1,831,324	293,737	310,922	44,900	762,457	56,606	1,468,712	362,612	767*	77,105	284,740	122,874
303	Missouri Pacific	99,312	24,318	123,860	21,092	27,602	1,806	11,860	9,130	92,142	39,928	.....	16,344	186,584	13,585
351	Morgan, La. & Tex. R.R. & S. Co.	259,903	88,891	373,239	47,452	42,647	10,000	142,252	13,129	255,880	117,359	425	16,000	101,784	43,931
379	Nevada & California	77,012	24,633	101,645	9,962	10,476	1,556	31,532	1,820	174,717	43,967	909*	6,200	192,553	27,634
196	New Orleans & Northeastern	906,593	43,830	969,051	27,825	41,498	8,250	92,324	6,622	179,547	89,484	.....	15,089	108,218	67,093
151	New York, Susquehanna & Western	177,082	44,063	243,707	15,234	20,738	1,745	34,304	2,778	68,899	30,902	1,113	5,143	26,872	32,048
262	Quincy, Ottawa & Kansas City	41,251	16,131	57,382	17,018	13,054	3,372	44,924	3,765	96,655	30,902	1,113	5,143	26,872	32,048
319	St. Joseph & Grand Island	82,529	28,133	127,552	23,021	13,054	3,372	44,924	3,765	96,655	30,902	1,113	5,143	26,872	32,048
454	St. Louis, Brownsville & Mexico	1,535,573	371,503	2,072,428	323,395	318,227	45,128	655,177	64,323	1,412,860	659,578	1,490*	63,161	594,921	24,894
2,098	St. Louis, Iron Mt. & Southern	85,653	11,917	99,690	10,366	12,021	1,778	28,616	4,936	117,767	41,922	.....	6,929	34,994	4,208
236	Southern Indiana	1,361,550	208,987	1,831,324	293,737	310,922	44,900	762,457	56,606	1,468,712	362,612	767*	77,105	284,740	122,874
268	Stevenson, No. & So. Texas	4,041	1,571	5,612	1,365	1,365	195	3,345	4,629	81,589	9,706	.....	2,933	6,773	4,113
248	Texas Central	56,163	27,269	83,432	25,040	17,359	2,101	36,274	3,523	76,969	17,359	.....	4,800	12,530	18,135
435	Toledo, Peoria & Western	60,333	29,384	89,717	14,899	20,172	2,101	36,274	3,523	76,969	17,359	.....	3,000	10,168†	46,587
455	Trinity & Brazos Valley	121,063	13,169	137,255	33,975	23,001	4,308	74,756	11,254	144,693	18,563	.....	6,000	12,583	16,831
171	Wicksburg, Shreveport & Pacific	70,126	32,180	102,306	20,908	23,001	3,445	40,259	4,478	92,091	18,563	.....	.....	.....	.....
271	Wisconsin, Minnesota & Pacific	32,889	14,341	51,410	10,005	5,390	3,131	22,611	2,433	38,562	12,848	4*	3,443	9,401	14,561
309	Alabama Great Southern	\$1,698,754	\$726,603	\$2,688,767	\$340,868	\$506,256	\$68,015	\$893,118	\$76,945	\$1,885,202	\$803,565	\$5,882*	\$103,574	\$694,109	\$310,187
237	Atlanta & Birmingham Air Line	498,897	180,433	1,159,933	102,706	155,354	11,341	276,613	16,664	462,678	252,415	.....	43,320	209,085	63,395
388	Central Branch	871,459	254,940	1,311,851	202,515	172,211	29,821	437,094	34,483	896,134	421,717	.....	85,500	336,217	31,122
285	Chicago, Cincinnati & Louisville	765,801	210,656	1,025,737	220,792	254,626	71,062	459,641	53,189	1,029,320	310,496	4,463*	29,965	638,815	33,548†
818	Chicago Great Western	4,864,085	1,428,285	6,266,786	813,300	1,233,589	328,065	2,733,269	288,067	5,456,290	810,496	12,812	125,042	409,908	70,140
329	Chicago, Indiana & Southern	1,874,298	146,734	2,126,043	228,542	415,089	68,733	828,963	61,583	1,603,910	522,133	.....	40,350	120,619	32,575
210	Chicago, Peoria & St. Louis	912,109	242,647	1,154,756	177,608	276,142	20,348	439,677	42,824	1,055,636	160,969	.....	55,222	437,574	50,217
194	Cleveland, Akron & Columbus	2,363,693	332,686	2,696,285	286,095	499,456	54,503	935,094	54,350	1,829,408	860,517	31,554	84,658	776,159	125,040
282	Duluth, Missabe & Northern	6,673,460	268,979	6,943,373	625,166	697,249	11,807	974,166	110,806	2,379,194	4,605,179	5,194	284,610	4,352,123	155,066
454	Fort Worth & Denver City	2,388,691	1,303,175	3,863,358	598,245	536,358	64,378	1,204,275	129,273	2,552,733	1,310,625	.....	9,971	353,266	116,447
196	Fort Worth & Rio Grande	617,971	262,940	932,670	113,247	82,693	25,371	306,131	41,991	569,433	363,237	.....	79,495	1,225,936	294,215
307	Georgia	1,512,275	553,764	2,197,495	394,155	323,569	75,159	897,176	63,742	1,753,801	443,594	.....	13,983	429,711	43,323
395	Georgia Southern & Florida	864,314	460,954	1,501,841	134,655	250,034	46,088	556,754	76,732	1,064,263	437,378	13,294	74,492	376,380	147,977
336	Grand Trunk Western	2,662,934	1,262,126	4,180,649	333,386	584,088	182,227	1,634,408	103,046	2,836,155	1,344,494	9,414*	288,000	1,047,080	367,450
191	Houston, East & West Texas	652,647	210,467	913,333	165,218	30,329	11,851	300,153	28,588	586,139	327,794	.....	30,483	297,311	69,356
379	Nevada & California	1,355,156	240,427	1,634,264	313,075	405,925	21,248	506,033	24,983	1,290,439	345,525	142*	59,672	284,011	208,244
177	Kanawha & Michigan	1,039,838	329,689	1,456,092	158,949	276,142	20,348	439,677	3,904	1,028,118	427,884	5,614	62,810	370,688	159,635
386	Midland Valley	480,678	198,880	722,237	173,641	104,729	15,312	213,765	39,904	637,942	84,295	12,610*	68,083	16,212	114,870
3,492	Missouri Pacific	1,734,678	3,062,167	16,315,000	2,299,365	2,476,795	425,538	6,796,941	532,659	12,531,298	3,783,945	12,610*	693,945	3,077,147	74,079
11,734	Morgan, La. & Tex. R.R. & S. Co.	232,941	83,641	318,765	186,606	140,413	14,388	308,387	80,802	791,196	389,566	.....		

Summary of Revenues and Expenses of Railways for March.

INTERSTATE COMMERCE COMMISSION.

The Portland Gateway Opened.

In re through passenger routes via Portland, Ore. Opinion by Commissioner Prouty.

The Northern Pacific, the Union Pacific lines and the Chicago & North Western are ordered to join in the sale of through passenger tickets between Seattle and other points in the Northwest and eastern destinations via Portland, Ore., and to accord through facilities, like the checking of baggage, over this route. Chairman Knapp and Commissioner Clark dissent from this opinion.

Discrimination Against Indianapolis.

Indianapolis Freight Bureau v. Cleveland, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Clements.

Complainant alleges unjust discrimination against Indianapolis in favor of Cincinnati, Louisville, New Albany, Evansville and Chicago in the application of charges for the transportation of furniture, etc., to destinations in Texas, Arkansas, Oklahoma and Louisiana under the so-called "two-for-one rule," permitting the application of carload rates on part car lots in excess of full carloads from Cincinnati, etc., whereas less than carload rates are charged on any excess from Indianapolis. The rule as applied on such shipments from

Car Surpluses and Shortages.

Arthur Hale, Chairman of the Committee on Car Efficiency of the American Railway Association, in presenting bulletin No. 47 giving a summary of car surpluses and shortages by groups from February 19, 1908, to May 12, 1909, says:

"This report shows a total of 284,479 surplus cars, an in-

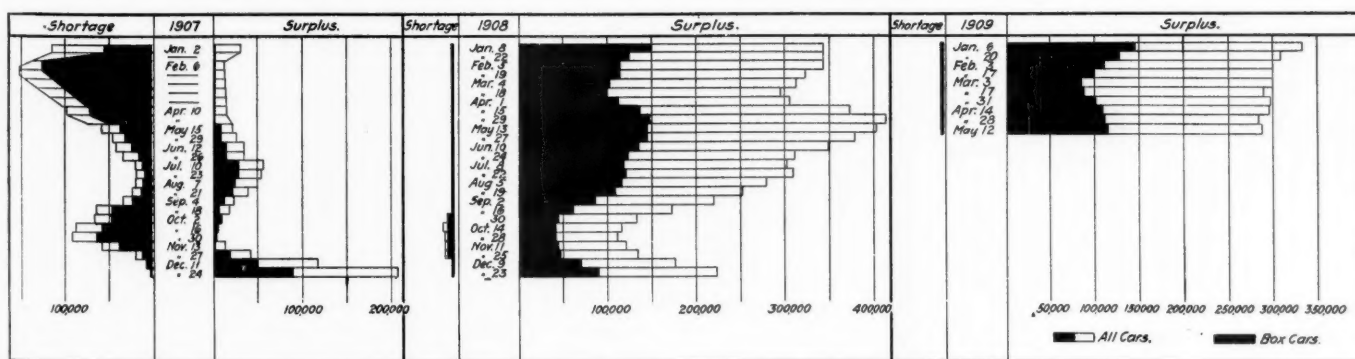
CAR SURPLUSES AND SHORTAGES, FEBRUARY 19, 1908, TO MAY 12, 1909, INCLUSIVE.

	Number of roads.	Surpluses.					Shortages.				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
May 12, 1909	158	113,601	16,574	105,684	48,620	284,479	78	4	22	83	187
April 28, 1909	161	107,665	16,487	110,538	47,638	282,328	144	106	74	173	497
April 14, 1909	163	108,291	17,692	122,982	47,698	296,663	80	135	109	19	343
March 31, 1909	158	101,344	20,428	128,546	46,282	296,600	158	98	116	27	399
March 17, 1909	161	88,459	20,328	139,997	42,634	291,418	310	74	27	139	550
February 17, 1909	159	98,512	23,924	135,208	43,797	301,441	266	97	11	96	470
January 20, 1909	162	127,204	26,723	116,680	41,057	311,664	163	21	139	35	358
December 23, 1908	158	87,350	16,247	79,595	38,885	222,077	471	42	289	217	1,019
November 25, 1908	160	45,194	12,157	43,854	31,624	132,829	7,923	178	900	209	9,210
October 28, 1908	158	39,383	10,185	31,541	29,803	110,912	8,175	167	2,261	236	10,839
September 30, 1908	160	42,593	10,365	49,795	31,039	133,792	7,313	450	224	127	8,114
August 19, 1908	160	106,367	13,494	92,500	40,642	253,003	465	90	105	194	854
July 22, 1908	166	120,580	14,401	125,739	47,960	308,680	115	37	330	27	509
June 24, 1908	163	123,112	18,042	130,149	41,995	313,298	266	34	120	31	451
May 27, 1908	160	144,697	20,075	162,695	54,437	381,904	82	13	12	18	125
April 29, 1908	159	147,971	24,350	186,742	59,542	413,605	145	42	16	64	267
March 18, 1908	160	103,509	25,122	119,205	49,206	297,042	533	151	250	73	1,007
February 19, 1908	161	113,776	30,088	134,217	44,432	322,513	697	141	249	162	1,249

crease of 2,151 over the report for April 28. The box car surplus increased 5,936, while coal and gondolas show a decrease of 4,854. Group 2 (Eastern), which includes the anthracite roads, show a large increase in coal and gondola, and also in box cars, while group 3 (Middle), composed largely of bituminous coal roads, shows a decrease of 10,235 in coal and

the other points mentioned should be extended to Indianapolis, but in such modified form as to eradicate manipulation whereby one shipper secures an improper advantage over another, or else the minimum weights should be readjusted so as to conform with the actual loading capacity of cars.

Unjust discrimination is alleged against Indianapolis and



Car Surpluses and Shortages in 1907, 1908 and 1909.

gondola cars. Group 6 (Northwestern) report fewer surplus box cars, while the surplus of this class increased slightly in groups 1 (New England), 9 (Southwestern) and 11 (Canadian)."

The accompanying table shows car surpluses and shortages in the period covered by the report and the chart shows surpluses and shortages in 1907, 1908 and 1909.

in favor of Chicago in respect to class and commodity rates enforced by defendants on shipments to Oklahoma. A proper relationship is suggested between the class rates and rates on furniture (new, n. o. s.), kitchen safes, etc., from Indianapolis to Muskogee, and the rates should not exceed those in effect from Cincinnati.

Complainant also alleges that defendants unjustly discrimi-

nate against Indianapolis in the transportation of vehicles, etc., to Arkansas common points in that the local class rates to East St. Louis are applied on such shipments from Indianapolis to common points in Arkansas, whereas on similar shipments from Chicago and the other points of origin mentioned, arbitrary differential bases via East St. Louis are applied, which added to the rate beyond, result in lower through rates. The commission is of the opinion that the several articles referred to should be accorded the same rates from Indianapolis as are applied from Cincinnati to Arkansas common points.

Unjust discrimination is alleged against Indianapolis in the application of class rates to points in Louisiana as compared with rates applied from Cincinnati and Louisville to same destinations. The commission is of the opinion that class rates from Indianapolis should not exceed those charged from Cincinnati to points in Louisiana.

The matters involved herein will be held in abeyance until June 28, 1909, for the purpose of permitting carriers to check in the rates and file tariffs in conformance with the views expressed. If by that date the carriers have not filed tariffs containing the changes suggested, the commission will then make such order as may appear necessary in the premises.

Same v. same.

Complainant alleges unjust discrimination against Indianapolis in favor of St. Louis in the application of class and commodity rates to points in Wisconsin, Minnesota and Michigan, particularly St. Paul and Winona, Minn. An order as prayed for in relation to the class rates is not warranted in view of the peculiar conditions under which traffic is handled and rates constructed from Indianapolis and the competing cities of St. Louis and Chicago to St. Paul and Winona territory. Chicago not only has the advantage of more intense railway competition, but is a much shorter distance and enjoys natural advantages of location over Indianapolis. Likewise St. Louis, while but little nearer than Indianapolis by short line, reaches St. Paul and Winona by direct routes, which must compete not only with each other, but also with boat lines plying on the Mississippi river.

While the class rates from Indianapolis to St. Paul are approximately 30 per cent. in excess of those from St. Louis, on many commodities the disparities between the rates are much greater. These greater disparities as between commodity rates are not warranted, and the commission is of the opinion that the same should not be greater ordinarily than those appearing in the class rates to St. Paul and group points, and also to Winona and group territory from Indianapolis and St. Louis, respectively. The case is retained with the expectation that the carriers will promptly readjust commodity rates in accordance with this suggestion.

Milling in Transit.

Douglas & Co. v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Clark.

Complaint arises from the withdrawal by defendants of certain transit privileges and rates which were in effect at the point where complainant's works are located for several years prior to the establishment of said works, and which are continued as to other manufacturers of grain products at that point.

It might be reasonable to withhold transit privilege from a product that is essentially different from the raw material and from the other products of the same raw material which are accorded transit rates, as, for example, a liquid product of grain; but it is clearly discriminatory to single out one or more of several milled products of grain and withhold from it or them transit privilege which is accorded at that or some other competitive point to other milled products of grain of substantially similar character, value and packing, and which are transported under substantially the same conditions where there is competition between the millers of the grain either in marketing their product or in securing their material for milling.

Defendants argue that the commission is without power to direct a carrier to grant a transit privilege. There can, however, be no question as to the right and power of the commission to order the removal of an unjust discrimination and

to prescribe such reasonable rates and regulations as will effect such removal. The commission desires to leave defendants reasonable opportunity to remove the unjust discrimination herein found in such manner as will best effect that purpose. Defendants may therefore submit for approval a plan for removing the unjust discrimination against complainant, and if that is not done the commission will consider entering such an order as will accomplish that object.

Additional Charges for Certain Sizes of Car.

Kaye & Carter Lumber Co. v. Minnesota & International et al. Opinion by Commissioner Harlan.

A carload rate and a minimum weight for a car of definite dimensions when lawfully published in the tariffs of a carrier constitute an open offer to the shipping public to move their merchandise on those terms; and it would be wholly unsound in principle to permit the carrier to impose additional transportation charges on the shipper who ordered a car of a capacity, length or dimension specified in its tariffs, simply because it is not provided with cars of the dimensions ordered. The obligation to carry the merchandise of shippers on the basis of the published rates and minimum weights, and to use whatever cars are available for that purpose, ought to have been covered in the published tariffs of the defendants by proper rule to that effect, and their tariffs were unreasonable and unlawful in not containing such a provision at the time these shipments were made. Reparation awarded.

STATE COMMISSIONS.

No Fare Reduction in Mississippi.

By unanimous vote the Railroad Commission of Mississippi decided on May 18 to leave the passenger fare at 3 cents per mile. It took this action after a hearing at which representatives of the various railways in the state argued that reduction of passenger fares would cause deterioration in service rendered and would interfere with railway development. Petitions bearing over 50,000 signatures were filed protesting against a reduction in fares, and there was only one petition, bearing only a trifling number of names, which was in favor of a reduction.

COURT NEWS.

At Rochester, N. Y., last Monday the federal grand jury indicted the Buffalo & Susquehanna and the Erie for making unlawful rates on freight.

The Circuit Attorney of St. Louis, Mo., has filed in the Federal court at Kansas City an appeal from the recent action of Judge Smith McPherson in continuing in force an injunction restraining the Circuit Attorney from prosecuting a suit in the state courts to restrain the railways in Missouri from raising their passenger rates from 3 cents per mile. The appeal was filed with the consent of Judge McPherson.

The railways of New Jersey which have been contesting the large increase in their taxes during the last few years have secured a decision in their favor from the Supreme Court of the state, which has set aside the assessments levied against terminal properties in Jersey City and Hoboken. The court holds that the assessments should have been made upon the basis of the actual market value of the property without consideration of the increased value which may be imparted by reason of its use under a railway franchise. The franchises of the railways are taxed separately for the use of the state and therefore should not be included in determining values of the so-called second class property, which includes the terminals. To do otherwise, the court holds, would mean the imposition of a double tax. The railways which appealed from the assessments on the terminal properties were the Erie, the Central of New Jersey and the Delaware, Lackawanna & Western.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

T. M. Johnson has been appointed the Paymaster of the Chicago Great Western, succeeding K. F. Draehr, resigned to engage in other business.

Edward Buckley, General Manager of the Manistee & North-eastern, has been elected the President, with office at Manistee, Mich. C. F. Kuehl has been appointed Auditor, succeeding P. R. L. Carl, transferred to the Operating department.

Operating Officers.

P. R. L. Carl, Auditor of the Manistee & Northeastern, has been appointed the General Manager, with office at Manistee, Mich., succeeding Edward Buckley, resigned.

John P. Burrus, Traveling Freight Agent of the International & Great Northern at Houston, Tex., has been appointed the Superintendent of Terminals, with office at Houston, Tex.

A. M. Ardery, Superintendent of Telegraph and Master of Transportation of the Virginia & Truckee, has been appointed the General Manager at Carson City, Nev., succeeding H. M. Yerington, resigned. Mr. Yerington will continue to perform the duties of Vice-President, which office he has also held.

Albert Wilcox, whose appointment as Superintendent of the Canadian Northern, with office at Dauphin, Man., has been previously announced, was born in 1865 in Kincardine, Ont. He began railway work in 1881 on the Toronto, Gray & Bruce, now part of the Canadian Pacific. In 1883 he became a telegraph operator for the Canadian Pacific at Winnipeg, and subsequently was made despatcher and then Chief Despatcher. In 1903 he was appointed Chief Despatcher of the Canadian Northern at Port Arthur, Ont., and the next year was promoted to Superintendent of District 2, with office at Winnipeg. In 1908 he was transferred as Superintendent to Port Arthur, which position he held until his recent appointment.

Sherwood S. Foley, whose appointment as Superintendent of the Canadian Northern at Saskatoon was recently announced in these columns, was born in 1871 at Lindsay, Ont. After a common school and high school education at Lindsay he began railway work in 1884 as operator and agent on the Northern & Northwestern, now part of the Grand Trunk. Two years later he became operator on the Canadian Pacific, later being made terminal agent, then despatcher and then Chief Despatcher. In 1901 he became despatcher on the Algoma Central, now the Algoma Central & Hudson Bay, and by 1903 had become Superintendent of Telegraph Construction. In 1903 he became terminal agent for the Canadian Northern, becoming successively despatcher, Chief Despatcher and Trainmaster, which position he held until his appointment on May 1.

Traffic Officers.

George H. Corse, Jr., has been appointed the General Oriental Agent of the Chicago, Milwaukee & Puget Sound, with office at Shanghai, China.

A. T. Stark, Soliciting Freight Agent of the Lehigh Valley, with office at Geneva, N. Y., has been appointed an Agent, with office at Rochester, N. Y.

H. H. Swearingen has been appointed a General Agent of the Chicago, Burlington & Quincy, with office at Billings, Mont., succeeding F. W. Klippel, resigned.

E. C. Nettels has resigned as Assistant General Freight Agent of the Chicago, Milwaukee & St. Paul to become Traffic Manager of the Postum Cereal Company at Battle Creek, Mich.

R. N. Collyer, a member of the Uniform Classification Committee, has been elected Chairman, succeeding F. S. Holbrook, resigned to become Chairman of the Official Classification Committee.

J. J. Dooley has been appointed a Contracting Freight Agent of the Iowa Central and the Minneapolis & St. Louis, with office at St. Louis, succeeding Baxter Weaver, resigned to go with another road.

Baxter Weaver, Contracting Freight Agent of the Iowa Central and the Minneapolis & St. Louis, at St. Louis, has been appointed a Commercial Agent of the St. Louis & Des Moines, with office at St. Louis.

C. L. Hunter, Commissioner of the Passenger Department of the Trunk Line Association, has been elected the Vice-Chairman in charge of the Passenger department, and his former title has been abolished.

J. L. Patton, Contracting Freight Agent of the St. Joseph & Grand Island at San Francisco, Cal., has resigned to accept the position of Contracting Freight Agent of the Wabash, in the same city. Frank C. Thompson succeeds Mr. Patton.

L. E. Paskill, Commercial Agent of the Wisconsin Central at Spokane, Wash., has been appointed a General Agent of the Chicago Division of the Minneapolis, St. Paul & Sault Ste. Marie (Wisconsin Central) with office at Tacoma, Wash.

A. E. Lee has been appointed a Commercial Agent of the Minneapolis & St. Louis and the Iowa Central, with office at Indianapolis, Ind., reporting to the General Freight Department at Chicago, succeeding R. M. Jenks, assigned to other duties.

E. J. McVann, Secretary of the Omaha Grain Exchange, has been elected Manager of the newly organized Traffic Bureau of the Commercial Club of Omaha, with office at Omaha, Neb. F. P. Manchester, formerly General Agent of the Union Pacific at Pueblo, Colo., succeeds Mr. McVann.

E. T. Campbell, recently appointed Traffic Manager of the Erie, began railway work as Commercial Agent of the Queen & Crescent in 1891. The next year he was assigned to duty in the general office at Cincinnati, and after remaining there for about a year was appointed by L. F. Day, then Traffic Manager of the Huntington Lines East of the Mississippi, chief clerk at Louisville, Ky. When Mr. Day was elected Chairman of the Southwestern Traffic Association, Mr. Campbell was appointed his Secretary, and in 1896 when the Association was reorganized as the Southwestern Freight Bureau Mr. Campbell was elected Chairman. In 1899 he was appointed Purchasing Agent of the Minneapolis & St. Louis, and in 1902 was made Purchasing Agent of the Erie, which position he held until his recent appointment.

George Stephen, whose appointment as General Freight Agent of the Canadian Northern has been announced in these columns, was born in 1876 at Montreal, Que. After a public and high school education at Montreal he began railway work in 1890 in the Foreign Freight department of the Canadian Pacific at Montreal. By 1899 he had become chief clerk to the Assistant General Freight Agent at Winnipeg. In June of the next year he was appointed Traveling Freight Agent for the western lines, and in December, 1900, was appointed Contracting Freight Agent for the Kootenay district of the Canadian Pacific. In 1901 he was made chief clerk in the Freight Traffic department of the Canadian Northern, and in 1906 was promoted to the position of Assistant General Freight Agent, which office he held until his recent promotion.

Engineering and Rolling Stock Officers.

F. O. Hill has been appointed the Supervisor of Bridges and Buildings of the Montpelier & Wells River, with office at Montpelier, Vt. This is a new office.

T. Kennard Thomson, M. Am. Soc. C. E. and a Consulting Engineer, with office at 50 Church street, New York, has been retained by the Erie as Consulting and Supervising Engineer for the Penhorn Creek viaduct.

The office of B. B. Kelliher, Chief Engineer of the Grand Trunk Pacific, has been moved from Montreal, Que., to Winnipeg, Man. The office of H. A. Woods, Assistant Chief Engineer, will remain at Montreal.

Railroad Construction.

New Incorporations, Surveys, Etc.

ANN ARBOR.—It is said that this company is building a six-mile branch from the main line to the New Haven coal mine.

BABYLON RAILROAD (ELECTRIC).—The New York Public Service Commission, Second district, has authorized this company to extend its lines from the present terminus in Babylon, Long Island, N. Y., to Amityville, 5.81 miles.

BELLINGHAM BAY & BRITISH COLUMBIA.—According to press reports bids have been asked for a new cut-off around the water front of Bellingham, Wash., four miles. The new line will join the present line at Wahl, and it is estimated will cost \$100,000.

BRITISH COLUMBIA ROADS (ELECTRIC).—John T. Langan, of Chicago, is said to be interested in a company which proposes to build a 100-mile electric line from Vernon, B. C.

CANADIAN NORTHERN.—Contracts have been let for lines in western Canada to be built this year as follows:

To the Northern Construction Co., Winnipeg, Man.: From Vegreville, Alb., southwest to Calgary, 235 miles; Goose Lake branch, building from Saskatoon, Sask., southwest, contract for 100-mile extension; Edmonton & Slave Lake from Morinville, Alb., north, contract for 50-mile extension; eastward from Ochre River, Man., 20 miles; west from Rapid City, Man., 30 miles.

To the Cowan Construction Co., Winnipeg, Man.: The Maryfield extension, southwest for 125 miles; the Prince Albert (Sask.) branch, 30 miles, eventually to be extended west to Battleford; the Oak Point (Man.) branch, 20 miles; the Rossburn extension, 30 miles. (May 14, p. 1051).

To N. K. Bolt, Calgary, Alb.: An extension from Wakapa, Alb., west, 12 miles.

CANADIAN PACIFIC.—According to press reports bids will be invited soon for grading and construction work on the Alberni extension of the Esquimalt & Nanaimo. (May 21, p. 1099.)

CHICAGO & NORTH WESTERN.—Surveyors are said to be at work in South Dakota, west of the Missouri river, from a point on the Pierre Rapid City line to a point north of Thunder Butte, to be opened for settlement this fall.

Surveys said to be under way for an extension from Dallas, S. Dak., northwest. The line may be continued northwest to a connection with the Pierre-Rapid City line, probably at Wendte or at Midland.

CHICAGO, MILWAUKEE & PUGET SOUND.—Track laying has been finished on this line and some freight trains are now being operated over the entire route. It is the intention to inaugurate regular freight service about June 1. (April 9, p. 820.)

A large number of branch lines are to be built, on which work is to be started this summer. (April 23, p. 918.)

CHICAGO, MILWAUKEE & ST. PAUL.—Two surveys are being made, it is said, from Mobridge, S. Dak., west, one running a little south of west towards the Thunder Butte country, and the other south to the crossing of the Moreau river thence west.

CHICAGO, ROCK ISLAND & PACIFIC.—Press reports say work will be started about July 1 on a connecting line from Ardmore, Okla., west to Waurika, about 55 miles.

EDMONTON & SLAVE LAKE.—See Canadian Northern.

GARVIN & NORTHWESTERN.—Chartered in Oklahoma, with \$100,000 capital stock, to build two lines of railway through McCurtain and Pushmataha counties. One of these lines will run from Garvin, Okla., northwest to Dexter, 55 miles, and the other from some point on the first line to Eagletown, 25 miles. The directors include E. E. Bushby, C. Gamble and G. A. Spaulding, of Garvin, and A. J. Waldrock, of Oklahoma City.

GARY, HOBART & VALPARAISO (ELECTRIC).—Work is said to have been started on a line from Gary, Ind., southeast via

Hobart to Valparaiso. The project is backed by the Hopkins Syndicate of Illinois, in which A. M. Hopkins is interested.

GRAND TRUNK PACIFIC.—Bids will be asked about June 1 for building a branch line from Biggar, Sask., north to Battleford, 49 miles. (May 7, p. 1007.)

GREAT NORTHERN.—See Harriman Lines.

GULF, COLORADO & SANTA FE.—An officer writes that track laying from Center, Tex., north to Zuber, 21.3 miles, will be completed by the end of May. (May 21, p. 1099.)

HAMPSHIRE SOUTHERN.—Contract has been let to the F. H. Blodgett Construction Co., Wheeling, W. Va., and work is to be started about June 1 from Romney, W. Va., southwest via Moorefield to Petersburg, about 40 miles. The project, it is thought, is being backed by the Baltimore & Ohio. The work will include building three steel bridges. W. B. Conwell, Pres., Fairmount, W. Va.; W. Tropnell, Ch. Engr., Romney. (April 23, p. 918.)

HARRIMAN LINES.—Julius Kruttschnitt, director of maintenance and operation of the Harriman lines, is said to have made the following statement:

"An arrangement has been made between the Northern Pacific, Union Pacific, and Great Northern, under which the Northern Pacific line between South Tacoma, Wash., and Vancouver, and the bridge over the Columbia river, will be used jointly by the three companies named.

"The Northern Pacific will at once begin work to complete the double-tracking of its road so as to care for the business of the three companies. The property will be used for any and all kinds of business by the three roads, and will be maintained as a first-class modern double-track road for all the interests named between Portland and Puget Sound."

IDAHO & WASHINGTON NORTHERN.—An officer is quoted as saying that track laying will be started this month on the extension from Newport, Wash., north to Ione, 52 miles. Grant, Smith & Co., Spokane, contractors. Contract is to be let soon for eight miles additional and a bridge over the Pend d'Oreille river, to be 275 ft. long and 85 ft. above the water. (March 19, p. 654.)

LACHINE, JACQUES CARTIER & MAISONNEUVE.—Incorporated in Quebec to build a line of railway from Lachine, Que., on the Grand Trunk, to a point in the Hochelaga section of Montreal. Extensions are projected from Lachine northwest to Dorval, and from Lachine to the northern end of Montreal Island.

MARSHALL & EAST TEXAS.—Press reports indicate that track laying on the extension from Marshall, Tex., south to Walker, 20 miles, has been begun, and that the new track is being laid with 60-lb. rails. (March 19, p. 655.)

MISSOURI INLAND & SOUTHERN.—Incorporated in Missouri. E. E. Young, Pres.; E. C. Halbert, Secy.; D. M. Meadows, Treas. It is said that Chief Engineer Palmer will have surveyors on the field by June 1 and that work of construction will begin by Sept. 15.

MISSOURI, OKLAHOMA & GULF.—Press reports indicate that this company will build a four-mile spur line in Muskogee county, Okla. (April 30, p. 961.)

MISSOURI PACIFIC.—According to press reports, a contract has been given to the Walsh Construction Co. for the grading and bridging in connection with the double-track work on the Illinois division of the St. Louis, Iron Mountain & Southern. This division extends from East St. Louis, Ill., south to Thebes, 129 miles. This work will include double-tracking from Bixby, Ill., to Brownsville, 26 miles; from Prairie du Rocher to Roots, 12 miles; from Raddle to Howardton, 14 miles, and from a point four miles south of Howardton to Gale, 23 miles, a total of about 75 miles. It is understood that this work will be completed by fall, ready for regular service.

NEVADA ROADS (ELECTRIC).—A company is being formed by S. Rosenthal and others interested in the Nevada Interurban, associated with T. S. Dunaway, V.-Pres. and Genl. Mgr. of the Nevada-California-Oregon Railway of Reno, to build from Reno, Nev., south around the base of Mount Rose to Lake Tahoe, about 20 miles.

NEW ORLEANS GREAT NORTHERN.—Announcement is said to

have been made that trains will be in operation between New Orleans, La., and Jackson, Miss., after July 1. (April 2, p. 775.)

NORTHERN PACIFIC.—See Harriman Lines.

OREGON RAILROAD & NAVIGATION Co.—According to press reports surveyors are now at work relocating the line from Hay, Wash., south to Riparia. The new line is to have easy curves and follow one side of Texas creek, as compared with the existing line which has sharp curves and crosses the creek at a number of points.

According to press reports work is to be started June 1 on a cut-off from Lockwood, Wash., east to the west shore of Coeur d'Alene lake, Idaho, about 13 miles. The new line will be about 25 miles shorter than the existing line.

PACIFIC & OREGON SOUTHERN.—According to reports from Central Point, Ore., work will soon be under way on this line. The projected route is from Central Point or Medford, Jackson county, Ore., west to near Wilderville, thence southwest to Selma, along the Illinois river valley, to a point near Deering, continuing southwest through the Chetco river valley and Mill creek flats to Crescent City, Cal., about 102 miles. Elias Ruud, Ch. Engr. The Central Point Commercial Club and residents of Medford are interested in the project.

PACIFIC RAILWAY & NAVIGATION.—Building from Hillsboro, Ore., west to Tillamook, 96 miles. In operation from Hillsboro for 27 miles and nearing completion on 15 miles from the Tillamook end. Contract is said to have been given recently to J. W. Sweeney, of Portland, for the remaining 53 miles. The work will be heavy, as this section is through a mountainous country, and will include 17 tunnels. The contract is said to amount to \$1,500,000. (Sept. 11, p. 934.)

ROGERS PEA RIDGE & NORTHWESTERN INTERURBAN.—Incorporated in Arkansas, to build from Rogers, Ark., northwest via Bentonville to Sulphur Springs, thence north via Neosho, Mo., to Joplin, about 70 miles. The plans include the construction of a repair shop and power plant at Rogers. Preliminary surveys, it is said, have been made, and it is expected that construction work will be started within 90 days. A. R. Potter, Pres.; W. T. Patterson and J. F. Walker, V-Pres.; B. Snyder, Sec., of Rogers, and J. J. Putnam, Treas.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See Missouri Pacific.

SOUTHERN PACIFIC.—According to press reports plans are being made to begin work soon on a new passenger station at Oroville, Cal., and raise the grade of the Marysville-Oroville branch, also renewing the trestles, reballasting the line and putting in 70-lb. rails. When this work is finished a cut-off is to be built from Oroville west to Nelson.

TEXAS ROADS.—R. A. Hall, of the Hall Construction Co., and Lieut. C. S. Ripley, of Denver, Colo., are interested in the proposed Hall railway between Pactolus, Colo. and Central City, 17 miles. There will also be a line from Pactolus to Russell Gulch, 22 miles, and a spur to Blackhawk, three miles. R. A. Hall, Pres., Central City.

TEXAS STATE RAILROAD.—See article on page 1137.

TOPEKA & NORTHWESTERN.—See Union Pacific.

UNION PACIFIC.—According to press reports a grading contract has been given to MacArthur Brothers for work on the Topeka & Northwestern, building from Onaga, Kan., northwest to Marysville, 32.44 miles. Sub-contracts recently let to E. W. Lammeraux for about 3½ miles, to C. W. Humbred for 4½ miles and to H. H. Hannanerat for 1½ miles. The latter contract includes a change of channel for the south fork of the Vermillion river near Frankfort. (March 19, p. 658.)

VANDALIA.—Press reports indicate that work is to be started soon enlarging the company's terminal at Terre Haute, Ind. The improvements will include new shops on a site of 120 acres. The work to be carried out at once is to cost about \$500,000, and further improvements, including several miles of double track, will bring the total cost up to \$1,500,000. (March 19, p. 659.)

WAUTAGA & DOE RIVER.—Incorporated in Tennessee to build and operate a railway from Point Virginia to a connection with the East Tennessee & Western Carolina near Blevins.

Railroad Financial News.

ATLANTIC COAST LINE.—A semi-annual dividend of 3 per cent. has been declared on the outstanding \$47,537,600 common stock, payable July 10. In 1906 and 1907 6 per cent. was paid, and in January, 1908, 3 per cent. was paid in 4 per cent. certificates of indebtedness. In July, 1908, and January, 1909, 2½ per cent. was paid in cash.

CANADIAN NORTHERN.—Mortgages securing \$1,000,000 equipment trust "series S" 4½ per cent. first mortgage bonds of 1909, maturing serially from 1910 to 1919, issued by the Imperial Rolling Stock Co., Limited, and guaranteed by the Canadian Northern, and equipment trust bonds "series T" of 1909 have been filed. Wm. A. Read & Co., New York, and the Dominion Securities Co., Toronto, Ont., are placing \$1,000,000 of the "series S" bonds. No amount has been announced for the "series T" bonds, but it is said that about \$1,500,000 are to be issued.

CHESAPEAKE & OHIO.—A quarterly dividend has been declared, payable June 28, on the \$62,799,100 stock outstanding. This puts the stock on a 4 per cent. per year basis. Since 1898 1 per cent. has been paid annually.

Collateral trust 6 per cent. notes amounting to \$7,500,000 have been called for payment on July 1 at 102. Cash to fund these notes was raised by the sale of \$11,000,000 general funding and improvement 5 per cent. bonds of 1909-1929. The sale of these bonds took place last December.

CHICAGO, CINCINNATI & LOUISVILLE.—The receiver has asked permission of the Federal court to issue \$1,500,000 receiver's certificates, the proceeds of which are to be used for improvements and for the purchase of equipment.

CHICAGO GREAT WESTERN.—It is understood that J. P. Morgan & Co., New York, have underwritten \$15,000,000 bonds to be issued by the Chicago Great Western under the reorganization plan. The bonds, of which \$60,000,000 are to be authorized, will be secured by a first mortgage and will bear 4 per cent. interest. It is planned to invest the control of the reorganized property in a voting trust for five years.

The Wisconsin, Minnesota & Pacific and the Mason City & Fort Dodge, controlled by stock ownership and operated under lease, will become a part of the Chicago Great Western. The official announcement of the reorganization plan, an unofficial outline of which was published in these columns May 14, page 1052, is expected to be made shortly. The conferences at the offices of J. P. Morgan & Co., which have been held by Frank B. Kellogg, counsel for the road; Horace Burt, receiver, and H. A. Vernet, representing the majority debenture holders, have been concluded.

CHICAGO, LAKE SHORE & EASTERN.—See Elgin, Joliet & Eastern.

CINCINNATI, HAMILTON & DAYTON.—The Boston News Bureau publishes the following plan as the agreement between the Baltimore & Ohio and the C., H. & D., which is understood to be substantially correct:

The Baltimore & Ohio will take over the practical operation of the C., H. & D. under an agreement to buy from J. P. Morgan & Co. the majority stock at the end of a seven-year period. During this seven years Baltimore & Ohio will guarantee the principal and interest of the \$11,307,000 4 per cent. refunding mortgage bonds. The other bond issues will not be disturbed.

Holders of the \$15,000,000 4½ per cent. three and one-half year notes will be given an income bond which at the end of the seven-year period may be exchanged for a straight 4½ per cent. bond or redeemed in cash by the Baltimore & Ohio at a price in the vicinity of 85. So far as the defaulted interest is concerned it will probably be paid off in securities at about 50 per cent. of the total amount involved. The defaulted interest on the \$15,000,000 notes now amounts to 13½ per cent., or over \$2,000,000.

The Cincinnati, Hamilton & Dayton stock which J. P. Morgan & Co. own was purchased over four years ago at \$160 per share, and it is figured that including the cost of carrying this stock for nearly four years, the investment stands the bankers to-day about \$200 per share. The price which Morgan & Co. are to receive for their stock

seven years hence when the Baltimore & Ohio buys the road will be determined by arbitration.

ELGIN, JOLIET & EASTERN.—Wm. A. Read & Co., New York, have bought \$9,000,000 first mortgage Chicago, Lake Shore & Eastern 4½ per cent. 60-year bonds. The bonds are jointly guaranteed, principal and interest, by the Elgin, Joliet & Eastern and by the United States Steel Corporation.

GENEVA, CORNING & SOUTHERN.—The stockholders' meeting originally called for May 29 to vote on approving a lease of the property to the New York Central & Hudson River and on making a mortgage to secure \$10,000,000 4 per cent. bonds of the New York Central & Hudson River "to be assumed by the Geneva, Corning & Southern," has been postponed until July 22. (April 2, page 775.)

GULF & CHICAGO.—See New Orleans, Mobile & Chicago.

JAMESTOWN, FRANKLIN & CLEARFIELD.—A meeting of the stockholders has been called for July 22 to vote on authorizing a lease of the company's property to the Lake Shore & Michigan Southern for the term of the corporate existence of the Jamestown, Franklin & Clearfield, and on making a mortgage securing an issue of \$25,000,000 4 per cent. bonds, the proceeds of which are to be used to adjust present indebtedness and for future additions and betterments. (Feb. 26, page 436.)

KANSAS CITY SOUTHERN.—L. F. Loree, President of the Delaware & Hudson and chairman of the executive committee of the K. C. S., has been elected also chairman of the board of directors, succeeding Herman Sielcken, who continues a director and a member of the executive committee.

MASON CITY & FORT DODGE.—See Chicago Great Western.

METROPOLITAN STREET RAILWAY.—The sale of the company's property under the foreclosure of the mortgage securing the \$12,500,000 general mortgage and collateral trust 5 per cent. bonds has been postponed from June 29 to November 18. (May 14, page 1052.)

MISSOURI RIVER & NORTHWESTERN.—C. O. Bailey, Receiver, announces that, effective May 1, the ownership of the property of this company passed to the Rapid City, Black Hills & Western, a new company. The line of the M. R. & N. W. runs from Mystic, S. Dak., to Black Hills, 34 miles.

MOBILE, JACKSON & KANSAS CITY.—See New Orleans, Mobile & Chicago.

NEW ORLEANS, MOBILE & CHICAGO.—A decree has been entered by the Federal court for the Western District of Tennessee ordering the sale under foreclosure of the Mobile, Jackson & Kansas City; the Gulf & Chicago, and the New Orleans, Mobile & Chicago. A similar decree has been entered in the Federal court for the Southern District of Missouri. The New Orleans, Mobile & Chicago was organized in June, 1908, under the laws of Mississippi to take over without foreclosure the Mobile, Jackson & Kansas City, 199 miles, and the Gulf & Chicago, 203 miles, and to build an extension to New Orleans. The New Orleans, Mobile & Chicago is mentioned in the decrees as the consolidated corporation, but it seems that the consolidation has never been carried out according to the original plans. The total indebtedness of the companies affected is stated to be \$5,000,000.

RAPID CITY, BLACK HILLS & WESTERN.—See Missouri River & Northwestern.

TREMONT & GULF.—The company has increased its stock from \$1,000,000 to \$5,000,000, and there is \$2,000,000 outstanding. There is also outstanding \$1,550,000 first mortgage bonds of February, 1908-1948. This is part of an authorized issue of \$5,000,000 bonds. The line of the company runs from Tremont, La., to Winnfield, 50 miles.

WESTERN PACIFIC.—The Denver & Rio Grande announces that it will endorse on all first mortgage 5 per cent. 30-year bonds of the Western Pacific an unconditional guarantee of interest. When the bonds were sold in 1905 provision was made that interest should be paid from the money received from the sale of the bonds themselves until the road was in operation and that after that the D. & R. G. should guarantee the interest.

WISCONSIN, MINNESOTA & PACIFIC.—See Chicago Great Western.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Southern Railway does not expect to buy new locomotives at present.

The Montpelier & Wells River has ordered one 65-ton mogul from the Baldwin Locomotive Works.

The Chicago & North Western has ordered 20 consolidation locomotives from the American Locomotive Co.

The Barre Railroad has ordered one 70-ton saddle back locomotive from the Baldwin Locomotive Works.

The Bessemer & Lake Erie advises that there is nothing in the report that it is in the market for locomotives.

The Buffalo, Rochester & Pittsburgh, as reported in the *Railroad Age Gazette* of May 21, has ordered from the American Locomotive Co. one simple Atlantic locomotive, eight simple consolidation and two simple decapod engines, all for September delivery.

General Dimensions.

Type of locomotive.....	Atlantic
Weight, total.....	183,500 lbs.
Weight on drivers.....	106,000 lbs.
Diameter of drivers.....	73 in.
Cylinders.....	20½ in. x 26 in.
Boiler, type.....	Straight top, radial stayed
" working steam pressure.....	210 lbs.
" number of tubes.....	333
" diameter of tubes.....	2 in.
" length of tubes.....	15 ft. 9½ in.
Firebox, type.....	Wide
" length.....	107 in.
" width.....	73¼ in.
" material.....	Worth Bros.' steel
" grate area.....	54.4 sq. ft.
Heating surface, tubes.....	2,729.8 "
" firebox.....	174.5 "
" total.....	2,904.3 "
Tank capacity.....	6,000 gals.
Coal capacity.....	10 tons.
Tractive effort.....	25,445 lbs.

General Dimensions.

Type of locomotive.....	Consolidation	Decapod
Weight, total.....	189,500 lbs.	268,000 lbs.
" on drivers.....	167,500 "	243,000 "
Diameter of drivers.....	57 in.	52 in.
Cylinders.....	21 in. x 28 in.	24 in. x 28 in.
Boiler, type.....	Extended wagon top, radial stayed	Conical connection type, radial stayed, with firebox combustion chamber.
" work'g steam pressure.....	210 lbs.	210 lbs.
" number of tubes.....	354	404
" diameter of tubes.....	2 in.	2 in.
" length of tubes.....	14 ft. 6¾ in.	15 ft. 6½ in.
Firebox, type.....	Wide	Wide
" length.....	107 in.	108 in.
" width.....	73¼ in.	73¼ in.
" material.....	Worth Bros.' steel	Worth Bros.' steel
" grate area.....	54.4 sq. ft.	55.5 sq. ft.
Heating surface, tubes.....	2,672	3,280
" firebox.....	190	255.5
" total.....	2,862	3,535.5
Tank capacity.....	6,000 gal.	9,000 gal.
Coal capacity.....	12 tons	14 tons
Tractive effort.....	36,827 lbs.	52,730 lbs.

Special Equipment.

Air brakes.....	Westinghouse
Axles.....	Hammered, open-hearth steel
Bell ringer.....	Hammett
Boiler lagging.....	Franklin magnesite sectional
Brake-beams.....	(Atlantic and decapod) Davis, (Consolidation) Buffalo
Brake-shoes.....	Am. B. S. & F. Co.'s steel-back flanged
Couplers.....	Climax
Draft gear.....	Westinghouse
Driving boxes.....	Cast steel
Headlights.....	(Atlantic) Pyle Elec. with Ross case (Consolidation and decapod) B. R. & P. standard
Injector.....	Monitor and Hancock
Journal bearings.....	B. R. & P. standard
Side bearings.....	(Atlantic and decapod) Miner, (Consolidation) Stucki
Piston and valve-rod packings.....	U. S. Multi-angular
Safety valve.....	Consolidated
Sanding device.....	Leach
Sight-feed lubricators.....	Nathan Triple Bull's-Eye
Springs.....	Railway Steel-Spring
Steam gages.....	Ashcroft
Tires.....	Midvale
Steam heat equipment.....	Consolidated Car Heating Co. (Atlantic and consolidation)
Tubes.....	Charcoal iron
Valve gear.....	Walschaerts, except Baker-Pilliod on one consolidation
Wheel centers.....	Cast steel

The Ann Arbor is said to have ordered two Atlantic engines in addition to the 12 consolidation locomotives reported in the

Railroad Age Gazette of May 14. This item is not confirmed.

The *Northern Pacific* is said to have ordered 10 locomotives from the Baldwin Locomotive Works. This is not yet confirmed.

The *Harriman Lines* are asking bids on locomotives. There will be about 145 engines, all heavy, and about 45 of them will be Mallet compounds.

The *Western Pacific* has ordered 45 consolidation engines, 40 ten-wheel passenger locomotives and 15 six-wheel switchers from the American Locomotive Co.

The *New York Central Lines* order for locomotives, noted in the *Railroad Age Gazette* of May 14, included 46 engines for the Michigan Central, of which nine will be built at the Montreal Locomotive Works. These are: One decapod, two six-wheel switchers and six Atlantic engines.

	General Dimensions.		
	Decapod.	6-wheel.	Atlantic.
Weight on drivers.....			153,000 lbs.
" engine truck			44,000 "
" trailer			47,000 "
" total	274,000 lbs.	163,000 lbs.	244,000 "
Wheel base, driving.....			13 ft.
" total, eng.	19 ft.	11 ft. 6 in.	33 ft. 7½ in.
" eng. & trndr	54 ft. 5½ in.	42 ft. 5¾ in.	65 ft. 8½ in.
Cylinders	24 in. x 28 in.	21 in. x 28 in.	22 in. x 26 in.
Driving wheels, diam.	51 in.	57 in.	75 in.
Boiler, type	Straight top.	Straight top.	Straight top.
" diameter	80 in.	67¾ in.	72 1/8 in.
" pressure	210 lbs.	180 lbs.	200 lbs.
Firebox	108½x73¼ in.	72½x65¼ in.	108½x75½ in.
Tubes, number	447	308	394
" diameter	2 in.	2 in.	2 in.
" length	19 ft.	16 ft.	21 ft.
Driving journals, Main,	10½ x 12 in.	9 x 12 in.	10 x 12 in.
Others,	9½ x 12 in.		
Capacity, water	8,000 gals.	5,100 gals.	7,000 gals.
Capacity, coal	12 tons.	7½ tons.	12 tons.
Tender, truck	4-wheel.	4-wheel.	4-wheel.
" wheels, diam.	33 in.	33 in.	36 in.
" journals	5½ x 10 in.	5 x 9 in.	5½ x 10 in.
Valve gear	Walschaerts.	Stephenson.	Walschaerts.
Brakes	Westinghouse	Westinghouse	Westinghouse

CAR BUILDING.

The *Chicago & North Western* is in the market for two parlor cars.

The *Central of New Jersey* is in the market for 1,500 freight cars.

The *Baltimore & Ohio* is preparing specifications on 70 coaches.

The *St. Louis & San Francisco* is in the market for 60 coaches.

The *Baltimore & Ohio* advises that it is not at present in the market for freight cars.

The *Pennsylvania* has ordered 17 steel passenger cars from the American Car & Foundry Co.

The *Bessemer & Lake Erie* advises that there is nothing in the report that it is in the market for cars.

The *Atchison, Topeka & Santa Fe* has ordered 500 combination automobile and furniture cars from the American Car & Foundry Co.

The *Aliquippa & Southern*, as reported in the *Railroad Age Gazette* of May 21, expects to buy some cars, but specifications are not yet prepared.

The *Temiskaming & Northern Ontario*, as reported in the *Railroad Age Gazette* of May 21, has ordered seven steel underframe cabooses from the Silliker Car Co.

The *Buffalo, Rochester & Pittsburgh* has ordered from the American Car & Foundry Co. the three steel underframe combination baggage and smoking cars mentioned in the *Railroad Age Gazette* of April 30.

The *Pukow-Tientsin*, Tientsin, China, is on the market for 100 low side gondolas, 100 high side gondolas and 50 box cars. These cars will be built according to English design and specifications, some of them being eight-wheel and some four-wheel.

The *Western Pacific* was reported in the *Railroad Age Gazette* of April 30 as having ordered 1,500 fifty-ton gondola

cars from the Pressed Steel Car Co. These were ordered by the Denver & Rio Grande, and while some of them may go to the Western Pacific the allotment has not yet been decided.

The *Missouri, Kansas & Texas*, as reported in the *Railroad Age Gazette* of May 21, has ordered 78 fifty-ton steel underframe flat cars from the Ralston Steel Car Co.; 111 fifty-ton steel underframe gondolas and 19 cabooses from the Mount Vernon Car Co., and 459 thirty-ton box cars, 7 thirty-ton ventilated box cars, 50 thirty-ton stock cars, 13 refrigerator cars for passenger service, 13 thirty-ton 40-ft. refrigerator cars, 18 fifty-ton steel underframe Hart convertible cars, 8 forty-ton side dump ballast cars and 40 thirty-ton furniture cars from the American Car & Foundry Co.

The *Maine Central*, as reported in the *Railroad Age Gazette* of May 21, has ordered fifty 50-ton gondolas and fifty 40-ton gondolas from the Standard Steel Car Co. for August delivery. The 50-ton gondolas are bottom and side discharge coal cars and will measure 40 ft. long, 9 ft. 6 in. wide and 4 ft. 4 in. high, inside measurements, and 40 ft. 7½ in. long, 10 ft. 1½ in. wide and 8 ft. 2 in. high, over all. Bodies and underframes will be of steel. The 40-ton cars are low side gondolas and will measure 37 ft. 10 in. long, 8 ft. 1 in. wide and 2 ft. 6 in. high, inside measurements, and 40 ft. 6 in. long, 9 ft. 4 in. wide and 6 ft. 4 in. high, over all. Bodies will be of wood and underframes of steel. The special equipment for both types includes:

Axles	Steel
Bolsters, truck	Cast steel
Brakes, 50-ton cars	Westinghouse
Draft gear	Tandem
Trucks, 50-ton	Arch bar
" 40-ton	Bettendorf
Wheels, 50-ton	Steel
" 40-ton	Chilled iron

IRON AND STEEL.

The *Texas & Pacific* is said to be in the market for rails.

The *Chicago & Alton* are said to be in the market for 10,000 tons of rails.

The *Harriman Lines* are said to be in the market for 40,000 tons of rails.

The *Chicago, Rock Island & Pacific* is said to be in the market for 22,000 tons of rails.

The *Minneapolis, St. Paul & Sault Ste. Marie* has ordered 10,000 tons of rails from the Illinois Steel Co.

The *Altus, Roswell & El Paso* has ordered rails for laying 33 miles of track from the Block-Pollak Company.

The *Western Pacific* has ordered 6,000 tons of bridge material from the McClintic-Marshall Construction Co.

The *Peoria & Pekin Union* is said to be in the market for about 1,500 tons of structural steel for bridge work.

The *San Antonio Traction Co.*, San Antonio, Texas, is reported in the market for four miles of 55-lb. T-rails.

The *Montpelier & Wells River*, Montpelier, Vt., has ordered 500 tons of 60-lb. open hearth rails from the Pennsylvania Steel Co.

The *Temiskaming & Northern Ontario* has ordered 2,000 tons of 80-lb. rails from the Algoma Steel Co. These will be used for sidings and double tracking.

The *Grand Trunk Pacific* is reported to have ordered 16,000 tons of rails from the Dominion Steel Co., to be delivered at Prince Rupert, B. C., in August.

The *Eastern Railway Supply Co.*, Baltimore, Md., has ordered 400 tons of steel from the Lackawanna Steel Co., for delivery at Louisville, Ky., and an additional order of 600 tons will be placed this month.

An *American Consul* in the United Kingdom reports to the Bureau of Manufacturers (Inquiry No. 3447) that a business house in the city in which he is located is in the market for 200 tons of steel rivets, and is anxious to get in touch with firms in the United States.

General Conditions in Steel.—Southern iron and steel districts are now said to be reporting considerable improvement,

especially during the last two weeks. The most convincing report is that inquiries are based on actual requirements and a genuine desire to buy, rather than for speculative information. The demand at the present time is said to be stronger than it has been during the past eighteen months. The low level of furnace operation reached last summer was 50 per cent., and present reports place this figure at 70 per cent. Independent iron and steel workers in the Pittsburgh district, whose wages were cut 10 per cent. last April, will have their old scale resumed on June 1.

RAILROAD STRUCTURES.

CANADIAN, TEXAS.—The Atchison, Topeka & Santa Fe roundhouse was totally destroyed by fire May 19. The loss is estimated at \$100,000.

DENISON, TEXAS.—The creosoting plant of the Missouri, Kansas & Texas at Greenville, which was destroyed by fire, will be rebuilt at Denison at a cost of about \$200,000. (Feb. 19, p. 383.)

EDMONTON, ALBERTA.—The Department of Public Works during 1908 built 284 bridges and has plans for 429 to be built this year. W. H. Cushing, Minister of Public Works, Edmonton.

HELENA, ARK.—A terminal company has been incorporated to build a passenger station. No plans have yet been made or the cost determined. W. S. Hawley, Ch. Engr., St. Louis, Mo.

KANSAS CITY, MO.—See item in regard to Kansas City Terminal Railway in another column. (May 21, p. 1102.)

MARSHALLTOWN, IOWA.—The Iowa Central has increased its general repair shop, which was 22 ft. x 160 ft., to 45 ft. x 160 ft. The company has also installed additional new machinery as follows:

- 2 return flue boilers.
- 1 400-h. p. feed-water heater.
- 1 150-h. p. Corliss engine.
- 1 85-in. Niles-Bement driving tire lathe with double quartering attachment.
- 1 42-in. Gisholt boring mill.
- 1 36-in. x 8-ft. bed Putnam planer.
- 1 30-in. x 14-ft. bed Schumaker & Boye engine lathe.
- 1 Niles-Bement-Pond, full universal radial drill, 5-ft. arm.
- 1 Warner & Swasey, No. 3, Universal turret lathe.
- 2 20-in. Cincinnati crank shapers

All the above tools are belt-driven. The following additional machinery has been installed in the blacksmith shop:

- 1 1600-lb. Monaghan steam hammer.
- 1 2-in. Acme heading and forging machine.

The following additional machinery has been installed in the car shop:

- 1 Niles-Bement-Pond heavy pattern, double-axle lathe.

MOOSE CREEK, ONT.—According to press reports the Grand Trunk intends soon to begin work on a new station.

NEW YORK, N. Y.—Sealed bids or estimates will be received by J. W. Stevenson, Commissioner of Bridges, Borough of Manhattan, until June 3, for building the railings, stairways, etc., roadway and foot-walk pavements and track and electrical equipment of the Manhattan bridge. (April 9, p. 823.)

OROVILLE, CAL.—See Southern Pacific under Railroad Construction.

PLUM COULEE, MAN.—Bids are wanted May 31 by R. Rogers, Minister of Public Works at Winnipeg, Man., for a steel bridge on concrete abutments over the river at Plum Coulee.

ROGERS, ARK.—See Rogers, Pea Ridge & Northwestern Interurban, under Railroad Construction.

SAN ANTONIO, TEX.—According to press reports the International & Great Northern will put up a freight house and make other improvements, including a subway, at the West Commerce street crossing in San Antonio, to cost \$250,000.

SPRINGFIELD, OHIO.—The Pennsylvania is receiving bids for a freight house to cost about \$35,000.

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound has begun the preparation of detailed plans and specifications for a new passenger station, but details as to the size, archi-

ture and cost of the structure will not be available for some time.

TAYLOR, TEX.—The International & Great Northern is having plans made to double the capacity of its shops. It is planned to have the shops accommodate all the car repairing and building work between Palestine, Tex., and Laredo. (May 7, p. 1010.)

TORONTO, ONT.—Bids are wanted by June 1 by J. J. Ward, Toronto, Ont., for the re-construction of bridges over the tracks of the Canadian Pacific and Grand Trunk lines at Dundas street.

TWIN FALLS, IDAHO.—Press reports indicate that a bridge, 700 ft. high, will be built to carry an electric road across Snake river canyon, at a point a short distance below the Great Shoshone Falls.

VERA CRUZ, MEX.—Work is said to have been begun on the new union railway station and terminal improvements. (Feb. 12, p. 334.)

WINNIPEG, MAN.—See item in another column regarding Grand Trunk Pacific shops and yards. (Feb. 12, p. 334.)

The proposed bridge of the Grand Trunk Pacific over the Red river will provide for a double-track railway. There will be a Strauss bascule span over a 100-ft. clear waterway at the western end. The construction in Winnipeg consists of elevated tracks with retaining walls and solid fill, crossing Mill, Water and Notre Dame streets, with through plate girders. The contract for the sub-structure was awarded to Haney, Robinson & Quinlan, and the superstructure to the Dominion Bridge Co., both of Montreal. The estimated amount of steel is 2,500 tons. (March 26, p. 729.)

SIGNALING.

The Wheeling & Lake Erie is to install interlocking plants at Spencer, Clyde, Bellevue, Monroeville, Massillon and Valley Junction, and at three crossings in Cleveland. Some of these plants will be mechanical, and some power, but how many of each has not yet been decided.

The Long Island has installed an interlocking plant at Hicksville, N. Y. It is equipped throughout with Federal switch guards instead of detector bars. This road is using the Federal switch guard instead of detector bars at Long Island City, with electro-pneumatic interlocking, and at Woodhaven with mechanical. The guards were subjected to severe working tests before being applied extensively.

The Lake Shore & Michigan Southern is putting in electric detector locking on all its switches at the Polk street plant, Chicago. This is an all-electric interlocking plant made by the General Railway Signal Company. It is the entrance to the passenger terminal of the Lake Shore-Rock Island at La Salle street. There are 280 functions, controlled by 134 working levers in a 192-lever frame. There will be 43 track circuits, all fed from storage battery, controlling 39 locks on switch levers in the machine. All lock circuits are normally open and are closed by pressing down on a floor-push, there being one push for each lock.

A Signal Engineers' Excursion.

On Monday last the Union Switch & Signal Company entertained a party of about 60, mostly signal engineers of prominent railways, on an excursion from Cleveland, Ohio, to Sterling, to see its new style electric interlocking machine lately installed there. Illustrations of the machine are given on another page of this paper. A special train was run over the Baltimore & Ohio, and the first stop was at Akron, where there is a Union all-electric plant at the Union station, which is used by the Cleveland, Akron & Columbus, the Baltimore & Ohio and the Erie. This is a 46-lever plant and has been in service since February. It has alternating current indication. The stop there was to give the visitors an opportunity to compare this plant with the new one at Sterling. The Union company's offices entertained the party with breakfast at Cleveland, luncheon at Akron, and a dinner at the Hollenden in Cleveland in the evening.

Supply Trade News.

J. W. L. Kerr has been appointed agent in the Chicago territory for the Lawrenceville Bronze Co., Pittsburgh, Pa.

The Buckeye Jack Manufacturing Co., Louisville, Ohio, has been working full time and with a full force since November, 1908.

Henry Lang was elected a director of the Ingersoll-Rand Co., New York, at the recent annual meeting, succeeding Jasper R. Rand, deceased.

W. P. Stevens, who has been associated with the Chicago office of the Consolidated Car Heating Co., Albany, N. Y., for the past 18 months, has resigned.

The Chicago Steel Car Co., Chicago, has increased its capital stock from \$50,000 to \$250,000. It has also increased the number of directors from four to five.

J. P. Morgan, Jr., has been elected a director and a member of the finance committee of the United States Steel Corporation, succeeding the late H. H. Rogers.

The Railway Steel Products Co., Elyria, Ohio, has been incorporated with a capital stock of \$100,000. The incorporators are C. D. Hine, L. A. Manchester, C. A. Manchester, Richard Garlick and J. A. Campbell.

The Allis-Chalmers Co., Milwaukee, Wis., has moved its Cincinnati, Ohio, office, in charge of F. C. Colwell, to 1603 First National Bank building, and its Cleveland, Ohio, office, W. B. Huskey, Manager, to 1407-9-11 Schofield building.

The Chicago office of the Buckeye Steel Castings Co., Columbus, O., will hereafter be in charge of C. B. Goodspeed, who is a director of the corporation. Mr. Goodspeed is a son of Major W. F. Goodspeed, deceased, founder of the company.

Peter Gray & Sons recently moved their office and factory to E. Cambridge, Mass., corner of Third and Binney streets. The main building has a basement and two upper stories, 117 ft. x 54 ft., with an ell 22 ft. x 34 ft., giving a total floor area of 22,000 sq. ft.

A meeting of all members of the Signal Appliance Association is to be held on June 8, at two o'clock, in the Engineering Societies building, 29 West 39th street, New York. This is the same day the Railway Signal Association holds its only meeting to be held in New York this year.

The Maxwell Concrete Steel Co., Detroit, Mich., announces that hereafter the Maxwell deformed bar for reinforcing concrete will be exclusively made and sold by the Q. & C. Company, West Street building, New York; Old Colony building, Chicago; Continental building, Baltimore, Md.; Penobscot building, Detroit, Mich.; and Land & Title building, Philadelphia, Pa.

R. C. Hallett has gone to the Estate of Edward R. Ladew, 82 Fulton street, New York, successor to Fayerweather & Ladew and J. B. Hoyt & Co., in connection with the sale of its leather beltings to railways. His headquarters will be at the main office. This concern has been a manufacturer of belts for 67 years. The plant is at Glen Cove, N. Y.

The Isthmian Canal Commission is asking bids up to June 14 on one 18-in. centrifugal pump and steam engine, one 20-h.p. section motor car, two gasoline motors, one 2-ton motor-driven trolley, one 2-ton electric hoist, one horizontal boring and drilling machine, one mortising and boring machine, and other machine tools, including a pneumatic riveter; also transformers, crucibles, steel cable and other supplies. (Circular No. 512.)

The several factories of the Westinghouse companies at East Pittsburgh, Pa., and Wilmerding, and of the Union Switch & Signal Co. at Swissvale, Pa., have added to their forces within recent weeks, owing to increased orders. In the Electric works the railway department has been making good records. While the month's business of that department for April was the largest in the company's history, owing to some few exceptionally large orders for railway apparatus, it was not expected that the record could be maintained. How-

ever, these orders have kept on coming in during May. Among the interesting work of this character which is now being turned out in East Pittsburgh are three locomotives for the Fort Dodge & Des Moines Southern. Two of these are to be used as freight locomotives and the other as an electric shifting engine. For the Honolulu Rapid Transit & Railway Co., Hawaii, thirty 60-h.p. railway motors are being made. The Havana Electric Railway Co., Havana, Cuba, has sent in an order for a complete sub-station and power-house equipment, consisting of two 1,000-h.p. turbo outfits, four 500-h.p. rotary converters, 18 transformers, as well as switchboard and auxiliary apparatus. The Wilkesbarre & Wyoming Valley Traction Co. is having forty-four 100-h.p. motors constructed for the equipment of some new cars which the company is adding to its rolling stock. An unusual number of orders for electric mining locomotives have been placed at the East Pittsburgh works. Within the last month these orders have averaged more than one locomotive per day, coming from coal companies in Pennsylvania, Virginia and West Virginia, from iron mines in Minnesota, and from copper, silver and gold mines in the West. The rate of improvement which set in at the shops of the Westinghouse Machine Co. some months ago is still being maintained, and the business for the month of May shows an unusual demand for gas engines of large size.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has added to its 5,000 h.p. of Crocker-Wheeler motors by installing a 500-h.p. synchronous motor. This machine will operate on a 3-phase, 25-cycle circuit at the unusually high potential of 6,000 volts. It will be used to drive a centrifugal pump. The Indiana Steel Co., Gary, Ind., has ordered from the Crocker-Wheeler Co., Ampere, N. J., 21 form W motors, aggregating 655 h.p., for rolling mill service. These machines will be used to operate cranes on a 200-volt direct-current circuit.

TRADE PUBLICATIONS.

Hand Cars and Velocipedes.—The Buda Foundry & Manufacturing Co., Chicago, has issued Bulletin No. 131 on hand cars, push cars, velocipedes and new style Paulus track drill.

A. C. Generator.—The Crocker-Wheeler Co., Ampere, N. J., has just issued Bulletin No. 114, which supersedes Bulletin No. 77, illustrating and describing coupled type a.c. generators. This bulletin contains interesting and valuable engineering information.

Hydraulic Jacks.—The Joyce Cridland Co., Dayton, Ohio, has just issued Bulletin No. 33, which contains a good amount of information concerning the operation of hydraulic jacks. Special mention is also made of the new speeding device for quickly running up the jack to the load.

Jacks.—The Buckeye Jack Manufacturing Co., Louisville, Ohio, has issued a new catalogue on the different kinds of jacks which it makes. The last page has an illustration of a Buckeye automobile jack, which is rated at one ton capacity, lifting a load of 3,900 lbs., or nearly twice its rated capacity.

Leather Belting.—The Estate of Edward R. Ladew, New York, successor to Fayerweather & Ladew, and J. B. Hoyt & Co., has just issued a small catalogue in regard to Hoyt's short lap leather belting and sundries. This catalogue contains an amount of general information on belting, also a table of prices on belts running from ½ in. to 26 in. wide.

Temperature Regulator, Steam Coupler.—The Gold Car Heating & Lighting Co., New York, is mailing an illustrated circular descriptive of its new stop valve temperature regulator, which was illustrated and described in the *Railroad Age Gazette* of May 14; also a circular descriptive of its universal straight port steam coupler, with interchangeable gaskets and nipples, which was illustrated and described in the *Railroad Age Gazette* of May 21.

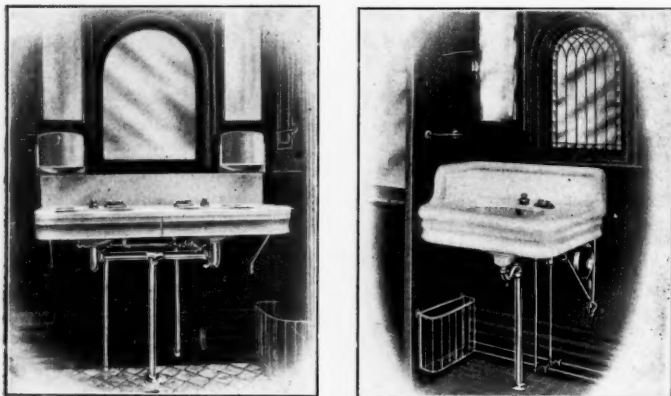
Freight Cars.—Those who are intending to purchase freight cars will do well to obtain a copy of the first edition catalogue just issued by the Middletown Car Works, Inc., Middletown, Pa. The catalogue is well bound in flexible leather, 13 in. x 10 in., and contains 185 pages, with illustrations, both half-tone and line cuts, showing the most representative

types of freight cars manufactured by this company. These illustrations show standard designs of the company, also those of purchasers, so that practically the entire field of freight car equipment is covered. Variations from any design may be arranged to suit special needs, for which the company will submit original drawings to meet unusual requirements. Some ten pages are devoted to freight car trucks, ranging from 15-ton to 50-ton. All of the illustrations are large, so that all details are well shown.

Watrous Vitreous Car Lavatories.

The Watrous Company, Chicago, has a new line of vitreous ware and white metal lavatories of special and attractive design for cars, two patterns of which are illustrated herewith. The New York Central and the Pennsylvania have recently put these lavatories on some private cars, for which they are especially adapted, although arranged in several different forms to meet all conditions and for all kinds of cars.

These lavatories are of extra heavy boxed-in construction with



Watrous Car Lavatories.

heavy roll rim and integral back cast in one piece, and oval shaped bowl with projecting edge to prevent splashing of water on the floor while the car is in motion. Suitable fastenings are provided to hold the lavatory securely in position to prevent any possible loosening or breakage of the same.

They resemble in appearance high-class residence lavatories, but are designed to occupy as small a space as possible without sacrifice of efficiency. They are made to fit into a recess or corner; they are also made with a flat back, or with right or left-hand ends if desired. They require very little attention to keep them clean, as no scrubbing or polishing is necessary. The fixtures are of the Watrous type, in general use in Pullman cars, the faucets being the combination push-button type, arranged to supply hot and cold water, or a mixture if desired. Controlling valves are applied to both hot and cold water lines, to enable the water to be turned off when necessary. The waste from the bowl is controlled by a metal plug, operated by turning the waste knob to the right or left. It is simple, cannot get out of order, and dispenses with the old style rubber plug. These fixtures may be used equally well in cars having either air or gravity water pressure systems.

Galena-Signal Oil.

John G. Milburn, in concluding his argument at St. Louis, Mo., in the suit of the Government against the Standard Oil Co., spoke as follows regarding the Galena-Signal Oil Co., Franklin, Pa., one of the defendants:

"The Galena-Signal runs itself—that is, Gen. Charles Miller is its president, and has been since in the '70s. He runs that business. It is his business. It is his achievement. . . . General Miller has built up the business until he lubricates almost all the railways in the United States, including the Panama Railroad. And we have here—they got in on some Government vouchers—the certificates of military engineers that only Galena oil will serve their purpose. Seventy-five per cent. of the railways of South America, 29 per cent. of the street railways of the United States, and substantial portions of the railways in England, France, Germany, Italy and other countries of Europe, use the oil. That is what General Miller has accomplished. And he has done it by having the best article—by an invention—by a discovery—by a secret process with the use of oxide of lead which produces that article—something which nobody else can do—by having a corps of experts who go to trains and instruct the men in its use and who watch its application. He sells lubrication—not oil by the gallon. . . . No basis exists for any charge against the Standard Oil in the achievements of General Miller with his Galena-Signal company. He is entitled to the credit. . . ."

National Railway Devices Company.

Announcement is made of the formation of the National Railway Devices Co., with offices at 400 Old Colony building, Chicago. The officers are: President, Jay G. Robinson, formerly Manager of Sales, Latrobe Steel & Coupler Co., Philadelphia, Pa.; Secretary, Francis E. Hinckley; Treasurer, H. C. Adams, President of the Jones & Adams Co., and of the Springfield Colliery Co. J. W. Luttrell, who was formerly Superintendent of the Locomotive and Car Department of the Missouri Pacific, will have charge of the mechanical work in connection with the devices of the company, and will join in the sales work. The devices include the Schroyer uncoupling apparatus, the Shoemaker pneumatic firebox door operator, the Dohlin automatic freight car door fastener, and the Turnbull driving wheel flange lubricator.

The uncoupling apparatus, which was designed by C. A. Schroyer, Superintendent of Car Department of the Chicago & North Western, was described and illustrated in the *Railroad Age Gazette*, June 12, 1908, page 88. It works with any of the present types of couplers, and does away with lifting attachments, thus avoiding the imposition of fines by the Interstate Commerce Commission due to faulty lifting attachments.

The Shoemaker fire-door operator opens and closes the door of the locomotive firebox by means of a single cylinder fitted with a differential piston, there being no springs to perform any part of the operation. The door is opened and closed in a uniform length of time, regardless of the air pressure, and there is no slamming of the door.

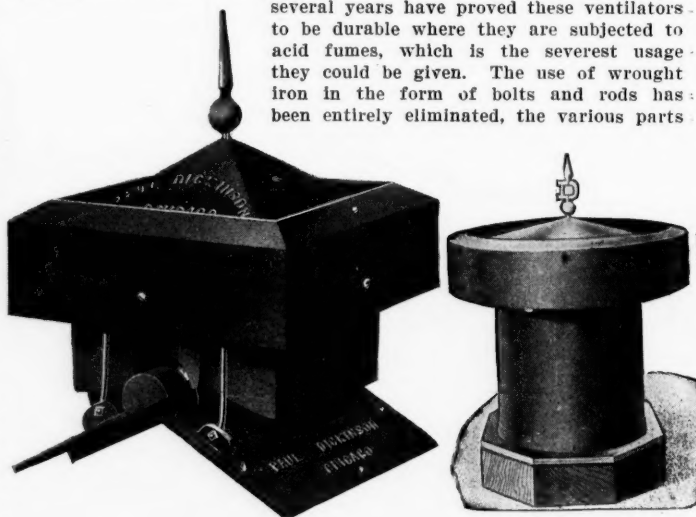
With the Dohlin freight car door fastener the door fastens automatically. There is therefore no need of dependence on employees to insert a pin, as with the staple and hasp fastening, an operation so much neglected. The device is made of malleable iron and can be sealed readily.

The Turnbull driving wheel flange lubricator is so designed as not to allow the lubricant to spread over the tread of the wheel and cause slipping. It is understood to have been tested by one of the large roads with entirely satisfactory results. It is quite simple, being attached to the frame of the locomotive above the driver, and adjusted to bring the lubricant, which is of a hard consistency, in contact with the flange with a uniform pressure. It is claimed that one road, in a year's trial of the device on a locomotive, reduced driver flange-wear 90 per cent. The present year's experiments included trial on an engine through snow and ice, the most severe test for such a device.

Dickinson Cast Iron Ventilators.

Paul Dickinson, Inc., Chicago, recently put on the market a complete line of cast iron ventilators. These are made in various designs, each for particular requirements.

It has been shown that this material is very economical for the purpose for which it is designed. Tests extending over a period of several years have proved these ventilators to be durable where they are subjected to acid fumes, which is the severest usage they could be given. The use of wrought iron in the form of bolts and rods has been entirely eliminated, the various parts



Square Ventilator.

Round Ventilator.

being supported by cast iron braces. By this method the life of the ventilators is not limited to the life of the rods and wrought iron bolts.

The ventilators are made either round or square shaped, as shown in the accompanying illustrations, and range in size from 9 in. to 48 in. The Dickinson idea of the adjustable roof connection, as used in its cast iron chimneys, is carried out in one type of these ventilators. Detailed drawings of the standard ventilators or any special requirements will be furnished. The offices of the company are in the Security building.